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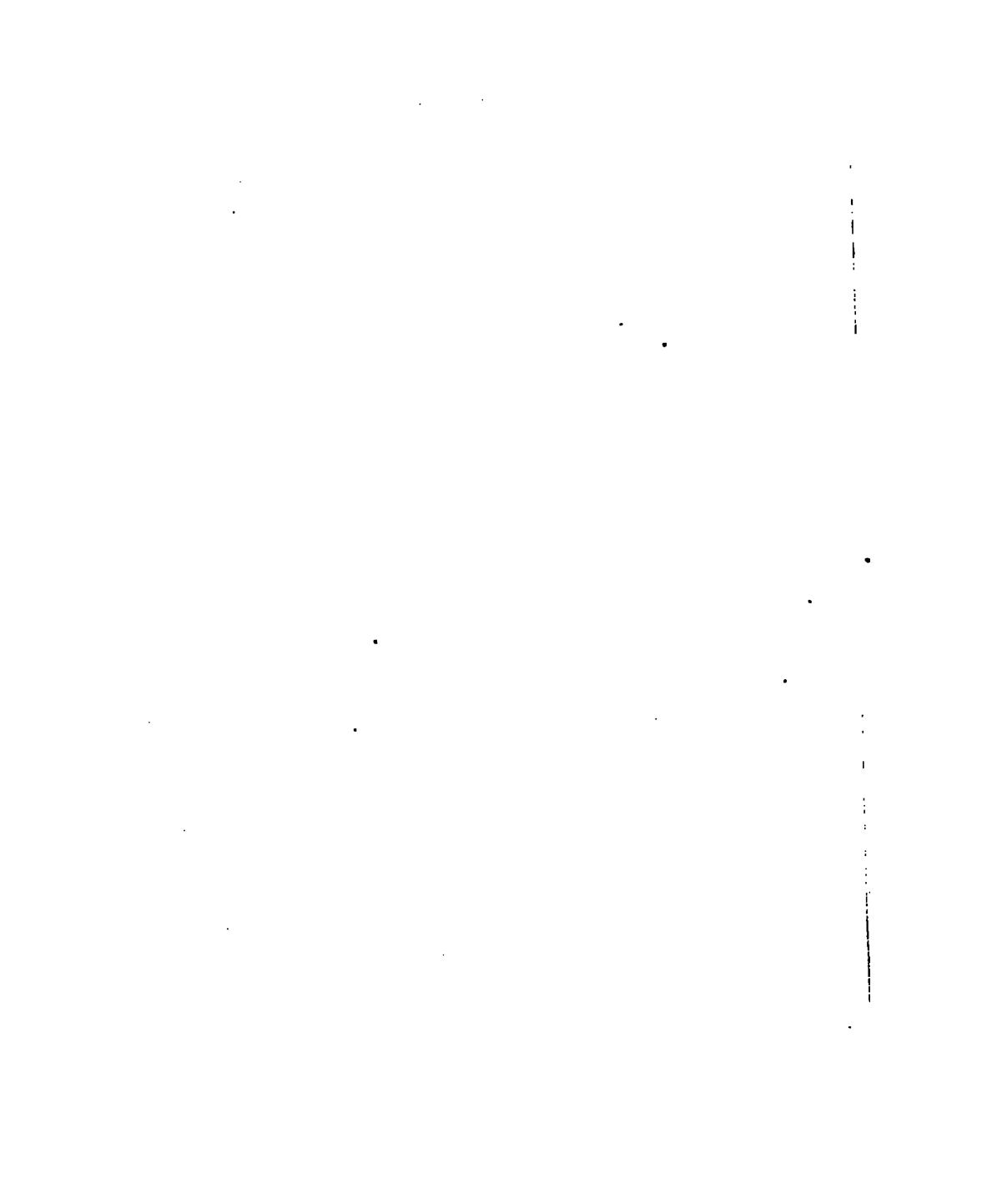
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The Students' Quiz Series.

GYNECOLOGY.

A MANUAL FOR STUDENTS AND PRACTITIONERS.

BY

G. W. BRATENAHL, M. D.,

Assistant in Gynecology, Vanderbilt Clinic, New York,

AND

SINCLAIR TOUSEY, M. D.,

Assistant Surgeon, Out-Patient Department, Roosevelt Hospital, New York.

SERIES EDITED BY

BERN B. GALLAUDET, M. D.,

Demonstrator of Anatomy, College of Physicians and Surgeons, New York; Visiting Surgeon Bellevue Hospital, New York.



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PREFACE.

IN compiling this quiz compend we have discussed the various diseases which affect the female generative organs, in the order of the anatomical position of the latter, beginning at the vulva; and we have given under each heading as complete a résumé of the subject as possible in the space at our disposal. As our authorities we are indebted to the works of the following authors, and to notes taken from the lectures of Prof. G. M. Tuttle: Pozzi, Thomas and Mundé, Mann's *System*, Martin, Schroeder, Shultz, Hegar and Kaltenbach, Skene, and Hart and Barbour.

It is hoped that the compend will prove of service both to the student and to the practitioner who wishes to refresh his memory upon some of the more important features of gynecology.

G. W. BRATENAHL,
SINCLAIR TOUSEY.

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GYNECOLOGY.

CAUSATION OF GYNECOLOGICAL DISEASE.

What are the chief causes of gynecological diseases ?

They may be divided into predisposing and exciting.

Predisposing Causes :

- (1) Neglect of out-door exercise.
- (2) Imprudence during menstruation, such as violent exercise at the menstrual period, going out too lightly clad, or getting wet feet, which result in cessation of the menstrual flow, endometritis, and other inflammatory conditions, with subsequent dysmenorrhœa, sterility, pelvic pain, etc.
- (3) Undue mental work during the period when the generative organs are developing, resulting in malnutrition of these organs.
- (4) Improprieties of dress, such as tight lacing, having skirts suspended at the waist, resulting in uterine displacements and congestive disturbances.
- (5) Improper postures, such as too much sitting down, sewing-machine work, high-heeled shoes tilting the body forward, etc.
- (6) Prevention of conception.
- (7) Improper care or neglect during parturition.
- (8) Induction of abortion.
- (9) Marriage with existing uterine diseases.
- (10) Habitual constipation.

Exciting Causes :

- (1) Injuries at parturition, lacerations of the cervix and perineum, pudendal and subperitoneal hæmatomele, inversion of the uterus.
- (2) Derangements of involution, subinvolution, superinvolution, retention of foetal envelopes, displacements of the uterus.
- (3) Congenital anomalies.
- (4) Sudden violent efforts, producing flexions, versions, and prolapse.

- (5) Neoplasms developing in the genital tract.
- (6) General peritonitis, producing deposits of lymph in the pelvis, and thereby displacements of the uterus.
- (7) Local treatment, sounds, tents, etc.
- (8) Gonorrhœa.
- (9) Syphilis.
- (10) Means adopted in criminal abortions.

DIAGNOSIS OF GYNECOLOGICAL DISEASE.

What are the means employed in attaining a diagnosis of gynaecological diseases?

- 1st. Rational testing of patient;
- 2d. Physical examination.

RATIONAL EXAMINATION.

What questions should be asked in taking a history?

Name? Age? Occupation? Residence? Married? Single? Widow? If married, how long? Number of children? First? Last? Labors easy or instrumental? Number of miscarriages? Last?

Menstruation? { Age when first appeared;
Type;
Duration;
Amount;
Pain before, during, after.

Leucorrhœa? { Character;
Amount;
Constancy.

Pain? { Locality;
Degree;
Character.

Bladder: Micturition, whether frequent or painful?

Bowels? Previous and family history? Duration of present illness? Chief symptoms?

PHYSICAL EXAMINATION.

What means are employed in making a physical examination?

- (1) Inspection; (2) vaginal touch; (3) bimanual manipulation;

(4) rectal touch; (5) abdomino-rectal exploration; (6) abdominal palpation; (7) speculum; (8) sound and probe; (9) abdominal palpation, with use of sound; (10) tents and dilators; (11) dull curette; (12) exploring needle and aspirator; (13) microscope; (14) auscultation and percussion.

Describe the method of making an examination.

A table covered with a blanket and provided with a small pillow should always, when practicable, be employed for examinations, instead of a bed or lounge. The patient should lie upon her back, with the knees well drawn up and abducted. A sheet should be spread over her, so as to conceal the entire person except the vulvar region. When a table is impracticable, the patient should be placed crosswise on her bed, the nates close to the edge, and the knees drawn up.

INSPECTION.

What is the diagnostic value of inspection?

By a thorough examination of the external genitals we may find enlargements of the labia majora, nymphæ, or clitoris; mucous patches and ulcers; pediculi pubis; character of the vulvar mucous membrane, whether inflamed or not, or violet-colored as in pregnancy. We note the condition of the perineum, whether lacerated or not; protrusion of the vaginal walls; urethral caruncle; character of any discharge coming from the vagina; condition of the hymen. Examine the orifices of Bartholin's glands; note whether reddened or not (a point in the diagnosis of gonorrhœal inflammations). Feel for enlargements of the glands themselves. Inspection of the abdomen will reveal the shape and size of a suspected tumor.

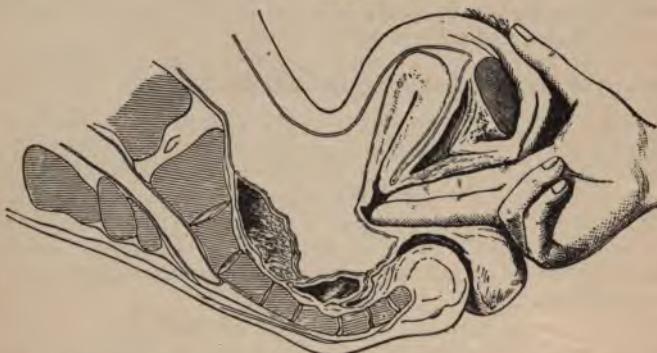
VAGINAL TOUCH.

What are the steps in performing a vaginal or a digital examination?

The patient having been placed on her back as described, the index finger of either hand is anointed with vaseline and introduced into the vagina from below up over the perineum, never from above downward. The other fingers are strongly flexed into the palm, while the thumb lies on the symphysis between the thighs. In married women two fingers, the index and middle, are employed, and intro-

duced backward into the hollow of the sacrum until the cervix is reached.

FIG. 1.



Showing the Position of the Hand in Digital Examination (Hart).

What conditions are sought for during this examination ?

(1) Thickness of the perineal body, as determined by approximating the thumb and index finger ; presence or absence of painful spots or spasm.

(2) Presence or absence of rugæ in the vaginal wall ; relaxation of the latter ; note whether dry, moist, or hot ; tumors of the vaginal wall or foreign bodies ; presence of faeces or tumor in the rectum.

(3) The cervix being reached, place the palmar surface of the finger against the os ; note direction, shape, size, consistence, and mobility of the cervix ; character of the surface, whether soft and velvety or roughened ; note character of the os, whether lacerated, stenosed, or patulous ; note bodies projecting through.

(4) Passing the finger along the posterior surface of the cervix into the posterior fornix, any tumor or hardness there should be noted.

What may be felt through the posterior fornix ?

- (1) Faeces in the rectum ;
- (2) Acute or chronic inflammatory deposits ;
- (3) Retroverted or flexed fundus uteri ;
- (4) Blood effusions ;

- (5) Fibroids attached to the posterior wall;
- (6) Ovary and tube prolapsed, inflamed, or cystic;
- (7) Ascitic fluid;
- (8) Extra-uterine foetation;
- (9) Retro-uterine and peritoneal abscess;
- (10) Thickened and tender utero-sacral ligaments;
- (11) Hydatid cysts and dermoid cysts (rare).

What may be felt through the anterior fornix?

The fundus of a normal, anteverted, anteflexed, or pregnant uterus; angle between the body and cervix normally; fibroids; inflammatory or blood affusions; tender ovaries (rare). A full bladder gives the sensation of a cystic tumor here.

What may be felt in the lateral fornices?

Tumors, fibroids, cysts, etc.; dilated Fallopian tube; tubal pregnancy; exudation masses; cellulitis, peritonitis; blood effusions into the broad ligaments; prolapsed and enlarged ovaries and tubes; latero-flexed uterus.

BIMANUAL EXAMINATION.

Describe bimanual examination.

This combines vaginal touch with abdominal palpation. The patient is placed as before, and the fingers introduced until the cervix is reached. The palmar surfaces of the fingers are then placed against the os externum and pushed upward toward the abdominal wall. At the same time the external hand is placed on the abdomen just above the symphysis, and a steady, gentle, but firm pressure is made with the balls of the fingers, the patient being told to breathe quietly, keep her mouth open, and relax the abdominal muscles. In this manner an attempt is made to approximate the internal and external fingers, and any intervening structures can be accurately mapped out. It is well to have a definite order to follow in making a bimanual examination: First push up the cervix, and if the uterus is in its normal position the fundus will come in contact with the abdominal hand and a transmitted motion will be felt. Next pass the internal fingers into the anterior fornix, and note any transmitted motion from a body felt here; this would be the fundus normally and in antepositions. Next pass back into the posterior fornix, behind the cervix, and continue the attempt at approximation of the two hands. In the same way the lateral for-

nices are thoroughly palpated. The right hand should be used internally for the right side, and the left for the left side. The

FIG. 2.



Position of the Hands in a Bimanual Examination.

most important step is first to ascertain the exact position, shape, and size of the uterus: after this the lateral fornices can be palpated, using the uterus as a landmark.

Describe the method of performing a rectal examination.

- (1) Tell the patient what is going to be done.
- (2) Scrape soap under the finger-nail and anoint the finger with vaseline.
- (3) Introduce the finger slowly, first forward, then upward.

What should be noted in this examination?

- (1) Existence or absence of hemorrhoids.
- (2) Fissures, fistular ulcers, strictures (specific or malignant), polypi.

Note position and size of cervix, posterior uterine wall, position, etc. of ovaries, existence of tumors.

Abdominal-rectal examination combines the above with pressure from the hand on the abdomen, as in bimanual examination.

Where is this method particularly valuable ?

In virgins and where the abdominal wall is rigid.

Recto-vagino-abdominal examination combines the middle finger in the rectum, the index finger in the vagina, and the other hand on the abdomen.

What is Simon's method ?

The introduction of the whole hand into the rectum. This is a dangerous practice, and is very seldom required.

SPECULA.

What are the three main forms of specula ?

- (1) Spatular—Sims's and Simon's speculum.
- (2) Tubular—Fergusson's.
- (3) Bivalve—Brewer's, Cuseo's.

Describe the Sims or duckbill speculum.

This is composed of two blades, set at right angles to an intermediate handle. Each blade is concave on the outer aspect and

FIG. 3.



Sims's Speculum.

convex on the inner. Usually one blade is shorter and smaller than the other.

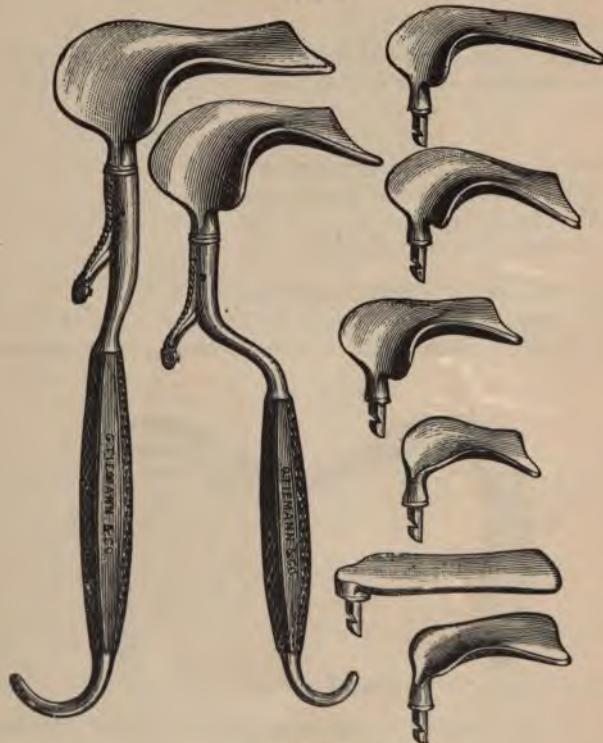
What is the Sims position ?

The patient lies on her left side and chest, with the left arm behind her over the edge of the couch or table; the hips close to the edge; knees well drawn up; and the upper knee touching the table with its inner aspect.

How is the Sims speculum introduced?

The blade to be introduced is warmed and oiled on its convex aspect; the labia are separated with the fingers of the left hand.

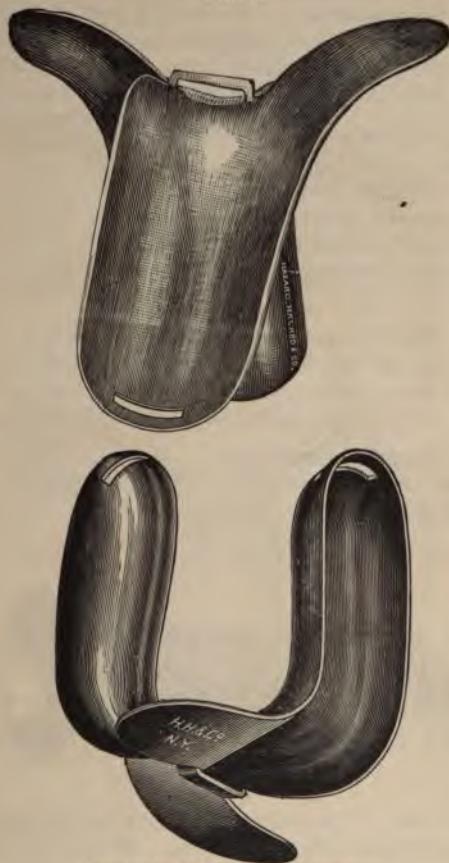
FIG. 4.



Simon's Specula.

The blade is then grasped in the right hand, with the index finger lying in the concave surface, and passed into the vagina over the perineum backward toward the hollow of the sacrum, as far as the posterior fornix behind the cervix. Traction is now made by an assistant backward, elevating the posterior vaginal wall, and the

FIG. 5.



Cleveland's Self-retaining Speculum.

internal extremity is tilted somewhat forward. The anterior vaginal wall is depressed with a depressor, and the cervix brought into view.

How should the speculum be held?

- (1) The outside blade can be grasped by the right hand of the

first in the long axis of the vulva, then turned transversely and pushed backward toward the cervix. Just before the latter is reached the blades are separated, bringing it into view.

What are the disadvantages of the bivalve speculum?

It conceals the anterior vaginal wall; it distorts the cervix; it cannot be used for operations on the cervix or vagina.

What are its advantages?

It is self-retaining, thus obviating the necessity of an assistant. It is the most convenient form of speculum for inspection of the cervix and local applications.

Describe the volsellum and bullet forceps.

The volsellum consists of two pairs of hooks on the ends of long

FIG. 8.



Volsellum Forceps.

scissor handles, which are provided with a spring catch. There may be two or more teeth on each hook.

The bullet forceps are the same as the above, with a single pair of teeth. These are of great use in drawing down the cervix for all operations, dilatations, etc.; to draw down and steady the uterus in rectal examinations; and to steady the uterus while making intra-uterine applications.

Describe the Sims tenaculum.

This consists of a steel hook, bent as shown in the figure, and

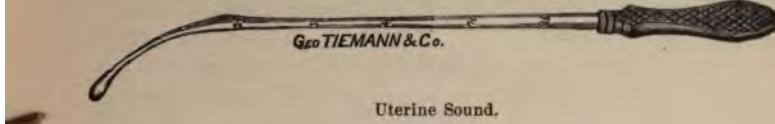
FIG. 9.



Sims's Tenaculum.

fastened into a slender handle. It is indispensable in all operations upon the cervix and perineum.

FIG. 10.



Uterine Sound.

SOUNDS.

Describe the uterine sound.

The best form of this instrument is the one devised by Simpson.

FIG. 11.



Method of Holding the Uterine Sound.

It consists of a graduated flexible metal rod having a knob $2\frac{1}{2}$ inches from the end, marking the depth of the normal uterus.

FIG. 12.



Method of Introducing Uterine Sound.

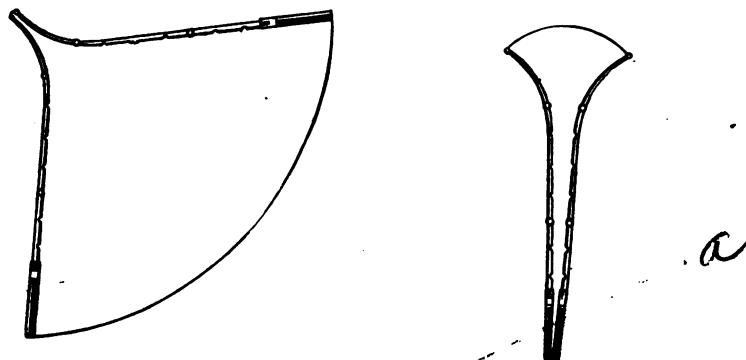
What are the contraindications to its use?

1st, pregnancy; 2d, presence of menstruation; 3d, any peri-uterine inflammatory condition, or tenderness of the uterus and appendages; 4th, malignant disease of the uterus.

Describe the method of introduction.

- (1) The exact curvature and position of the uterus are ascertained by bimanual examination.
- (2) The vagina is thoroughly cleansed.
- (3) The curvature of the sound is made to conform to that of the uterus.
- (4) The index finger of the right or left hand is introduced into the vagina to the cervix, and the sound, passed along this with its concavity backward, is guided into the uterus (Figs. 11 and 12). When it is thoroughly engaged in the cervix the handle is made to describe a semicircle from left to right, bringing the concavity forward (Fig. 13). Now, if the handle is depressed toward the

FIG. 13.



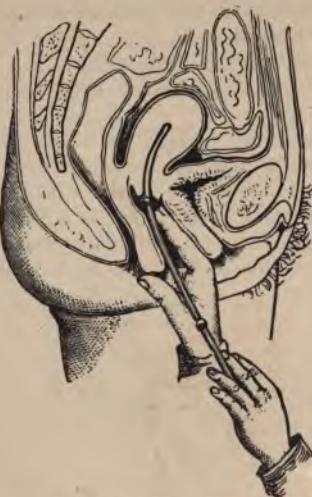
Diagrams illustrating Introduction of Uterine Sound.

perineum, the sound will readily pass into the fundus, as shown in Fig. 14. No force is to be used, and the handle should be held lightly between the thumb and forefinger.

What can be ascertained by the use of the uterine sound?

- (1) Potency and size of the external os and cervical canal.
- (2) Presence of intra-uterine growths.
- (3) Condition of the endometrium.
- (4) Sensitiveness of the internal os.

FIG. 14.



Uterine Sound Introduced.

(5) Direction of the cervical canal and exact position of the fundus.

(6) Relation of the uterus to a tumor.

It should not be used to replace a malpositioned uterus or to test its mobility.

What four classes of instruments are employed in obtaining a dilatation of the cervix?

(1) Tents; (2) graduated steel and hard-rubber sounds; (3) steel branched dilators; (4) dilatable rubber tubes.

TENTS.

What are the three varieties of tents?

(1) Sponge, consisting of a cone of compressed sponge rendered aseptic and covered with a layer of grease. It is provided with a tape at the base to assist in removal.

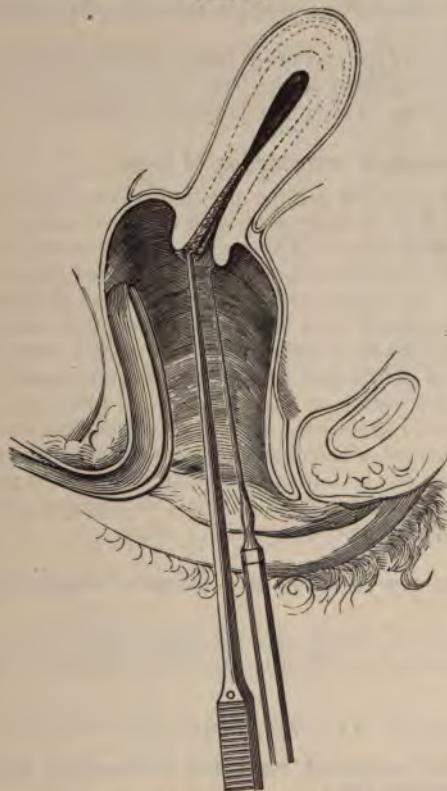
(2) Laminaria or sea-tangle tents, made from the *Laminaria digitata*.

(3) Tupelo-wood, made from the *Nyssa aquatilis*.

Describe the advantages and disadvantages of each.

Sponge tents dilate rapidly, but are painful and likely to give rise to septicæmia from abrasions of the mucous membrane. They

FIG. 15.



Introduction of a Tent (Sims).

are now entirely discarded. Laminaria tents dilate much more slowly, but are more aseptic, and from their small size it is possible to introduce several at a time into the cervix. Tupelo tents are

the best of all. Their expansibility is equal to the sponge tents, they dilate equably, and do not abrade the mucous membrane. Sepsis following their use is rare.

What are the indications for the use of tents?

- (1) Uterine hemorrhage unexplainable by other diagnostic measures.
- (2) Locating polypi and other intra-uterine growths.
- (3) For the treatment of the latter and for the removal of products of conception. (This is a dangerous practice.)

Describe the mode of introduction of tents.

The patient is placed in Sims position. Sims's speculum being introduced, the cervix is grasped with a pair of bullet or volsellum forceps and drawn down. The vagina is now thoroughly irrigated with 1 : 1000 bichloride-of-mercury solution and the cervical canal swabbed out. Previously the exact position of the uterus should have been ascertained by a bimanual examination, and the curvature of the tent made to conform to that of the uterus. The tent is then grasped with a pair of forceps or a tent-passor and gently inserted in the direction of the uterine canal (Fig. 15). A pledget of cotton is placed against the cervix and the patient put to bed. If pain is experienced, a morphine suppository may be administered. The tent should not be left in more than from six to twelve hours, and the patient should be kept in bed a day longer. Tents should never be introduced at the physician's office.

How are tents now regarded as a means of diagnosis and treatment?

They have been almost entirely superseded by the other dilators, and, according to Thomas, should be discarded entirely.

STEEL AND HARD-RUBBER SOUNDS.

What forms of graduated steel and hard-rubber sounds are in use? Describe them.

- (1) Peaslee's; (2) Hank's; (3) Hegar's.

The Peaslee dilators (Fig. 16) resemble male sounds, with less curvature and a bulb $2\frac{1}{2}$ inches from the end. They range in size from a 15 to 20 French male sound. The Hanks variety have oval

extremities of various sizes, capable of being screwed into a sigmoid handle. The Hegar dilators are made of hard rubber with a detachable handle, and are shaped like male sounds. They range in size from 1 to 30.

FIG. 16.

Describe the mode of introduction.

The patient being placed in Sims position, a Sims speculum is introduced. The vagina is thoroughly irrigated with 1:1000 bichloride-of-mercury solution, and the cervical canal is swabbed out. The anterior lip of the cervix is grasped with volsellum or bullet forceps, and drawn down. Dilator is introduced by the right hand as the uterine sound. After completion of dilatation the cervix is swabbed off again and dusted with iodoform. An iodoform gauze tampon is introduced, and patient put to bed for twelve hours. The dorsal position may be used.

STEEL BRANCHED DILATORS.

What are the best forms of the steel branched dilators?

- (1) Goodell's modification of Ellinger's; (2) Wylie's modification of Sims's; (3) Palmer's.

The Goodell-Ellinger is probably the best, though the most expensive variety. It is constructed in two sizes, small slender blades and large powerful ones. These blades separate in parallel lines; the handles are provided with a graduated scale having a screw attachment.

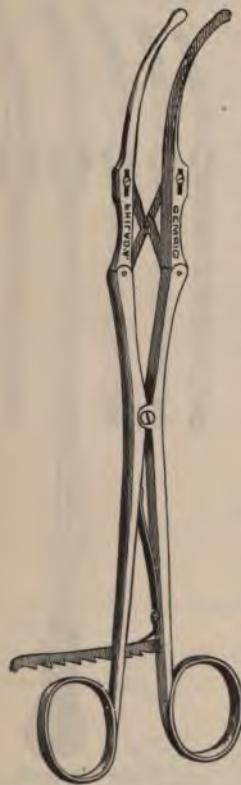
What are the indications for the use of dilators?

- (1) Stenosis of the cervix; (2) constriction at the internal os from anteflexions, etc.; (3) dilatation of the cervix for diagnostic purposes or to clean out the uterine cavity after abortions, etc.



Peaslee's Dilators.

FIG. 17.



Goodell-Ellinger Dilator.

FIG. 18.

Wyle's Modification of
Sims's Dilator.

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How are the branched dilators used?

These are best introduced in the lithotomy or Simon's position, with the use of Simon's speculum, owing to the advantages of excit-

ing counter-pressure on the fundus. The vagina is thoroughly cleansed with 1 : 1000 bichloride-of-mercury solution. The cervix is drawn down and the blades introduced up to the shank. Dilatation is made gradually by means of the screw, so as to enable the muscular fibres of the cervix to yield instead of rupturing. The blades may be separated 1 or 1½ inches. Anæsthesia should always be employed for complete dilatation, and subsequent treatment should be as described above for the graduated sounds.

DILATABLE TUBES.

Describe Barnes's bags.

These are small rubber bags of various sizes, provided with a rubber tube. On one side of the bag is a small pocket for the end of the bougie, by means of which it is introduced into the cervix. They are inserted empty, under the usual antiseptic precautions, by sight with a speculum or by touch. They are then injected slowly with air or warm water by means of a Davidson syringe.

What is another good dilator of this variety ?

The Allen's surgical pump, which is provided with india-rubber bags similar to Barnes's, and expanded with air or water by means of the pump.

Under what conditions are these elastic dilators most useful ?

(1) In a pregnant uterus ; (2) intra-uterine growths with patentous os.

What are the dangers from the use of dilators ?

(1) Lacerations of the cervix ; (2) endometritis ; (3) salpingo-oophoritis ; (4) sepsis.

THE CURETTE AS A DIAGNOSTIC AGENT.

What are the two forms of the curette ?

The sharp and the dull.

Which of these is used in diagnosis ?

The dull curette.

Describe it.

It consists of a smooth wire loop on the end of a flexible metal

FIG. 19.



Thomas's Dull Curette.

shaft (Figs. 19 and 20), and is made in three sizes.

FIG. 20.

Sims's Sharp Curette: *a, b*, showing the angles at which it may be bent.**What can be ascertained by its use?**

(1) The character of the contents of the uterus and the condition of the endometrium; (2) the cause of persistent hemorrhage or profuse leucorrhœal discharge. It scrapes away fungous growths from the mucous membrane, and removes sloughing masses in malignant disease and retained secundines after abortions.

How is it employed?

The patient is placed in the Sims or the dorsal position (the latter is somewhat the better, owing to the advantage of exerting counter-pressure over the fundus). A Sims or Simon speculum is introduced; the cervix is grasped by its anterior lips with a pair of bullet or volsellum forceps, and drawn down. The cervix and vagina are thoroughly irrigated and swabbed out with 1:1000 bichloride-of-mercury solution. Dilatation of the cervix may be required. The direction of the uterine canal having been previously ascertained, the curvature of the curette is made to correspond. It is then introduced into the fundus as a sound with the right hand, the left exerting counter-pressure over the fundus.

The anterior wall is now gently scraped down and the curette removed, bringing with it any uterine fungosities or other matter that may be present. It should be rinsed off in 1:20 carbolic-acid solution before being reintroduced. For diagnostic purposes this will suffice, but for a curative effect the whole lining membrane must be scraped down until it becomes smooth. The uterine cavity is then thoroughly irrigated with several quarts of hot 1:100 carbolic-acid solution by means of a double-current catheter. When the hemorrhage following curetting is severe, $\frac{1}{2}$ j. or $\frac{3}{4}$ j. of tr. iodi may be added to the hot water. The vagina is then dried, and the endometrium painted with pure carbolic acid or iodized phenol:

R. Tr. iod., gr. xl;
Pure carbolic ac., $\frac{3}{4}$ j.

An iodoform gauze tampon is placed over the cervix, the volsellum and speculum are removed, and the patient is put to bed for at least twenty-four to forty-eight hours.

Thorough antiseptic precautions must be preserved with regard to the hands and instruments throughout a curetting. An anæsthetic should be administered when practicable, particularly if a sharp curette is employed.

What other forms of curettes are in use?

Martin's (Fig. 21), shaped like the original Recamier, but having

FIG. 21.



Martin's Curette.

a dull edge; Simon's spoon; Sims's and Emmet's sharp curettes.

What are contraindications of curetting?

(1) Suspicion of pregnancy; (2) evidences of recent exudation about the uterus; (3) tenderness in the fornices.

What are the dangers of curetting?

(1) Sepsis, causing inflammation of the uterus, appendages, or peritoneum;
(2) Hemorrhage;

(3) Curetting with coexisting tubal disease, such as pyosalpinx, is likely to cause rupture.

Describe the Bozeman-Fritsch double-current uterine catheter.

This consists of two tubes—one enclosing the other at its extremity, where it is curved to conform to the uterine cavity. The outer tube is provided with a fenestrum on either side, and a third opening on its convex aspect about three inches from the end.

FIG. 22.



Bozeman's Intra-uterine Back-flow Tube.

The fluid flows in by the small tube through the large fenestrum, irrigating the uterine cavity; passes back through the large fenestrum, and out at the smaller opening. The latter lies outside of the external os.

EXTERNAL ORGANS OF GENERATION.

ANATOMY.

What are the external organs of generation ?

The external genitals, also called *vulva* and *pudendum*, include that portion of the genital tract which is visible when the subject lies upon her back with the knees drawn up and abducted and the labia majora separated. They are as follows :

(1) Mons veneris ;	(7) Fourchette ;
(2) Labia majora ;	(8) Fossa navicularis ;
(3) Labia minora ;	(9) Ostium vaginalis and vagina ;
(4) Clitoris ;	(10) Bulbs of the vagina ;
(5) Vestibule ;	(11) Bartholin's glands.
(6) Meatus urinarius ;	

The *hymen* is sometimes included with these, but really separates the external genitals from the vagina.

The *bulbs of the vagina* and *Bartholin's glands* are structures regarded as common to the vulva and vagina.

The *mons veneris* is a triangular cushion of skin and adipose tissue situated in front of the symphysis pubis, and it is covered after puberty with a thick growth of coarse, curly hair, usually a few shades darker than the hair of the head. It is bounded above by a slight groove at the lower limit of the hypogastrium, and below becomes continuous with the labia majora. The collection of fat is supported by connective tissue; the skin is thick and contains numerous subaceous and sweat glands.

The *labia majora* are two thick folds of integument, enclosing fat, connective tissue, and blood-vessels, which extend from the lower part of the mons veneris (anterior commissure) downward and backward, uniting with each other in the posterior commissure about an inch in front of the anus. Each has an inner and outer surface, the latter after puberty being covered with hair, and they are rich in sebaceous and sweat glands. The inner surface resembles mucous membrane, but contains a few hair-follicles.

The elastic tissue of each labium is arranged in the form of a sac, with its neck at the external inguinal ring, and here are sometimes found the remains of the canal of Nuck, a process of peritoneum prolonged upon the round ligament. When this is pervious it may be the seat of a labial hernia. The terminal fibres of the round ligament are also found in this portion. Normally, in the adult the labia are full and rounded and lie in contact with each other. In old age they become atrophied and separable, allowing the labia minora to protrude.

The arterial supply is derived from the superficial perineal branch of the internal pudic and superficial pudic. The veins begin in a rich subcutaneous plexus and unite with the vaginal bulbs. They accompany the arteries. The nerves are derived from the superficial perineal branch of the pudic and the inferior branch of the small sciatic. The lymphatics enter the inguinal glands.

Describe the *labia minora*, or *nymphæ*.

These are two muco-cutaneous folds situated between the labia majora. They begin anteriorly below the anterior commissure in two divisions. The upper divisions, or roots, unite with each other above the clitoris, forming its prepuce; the lower divisions unite

below to form its *frænulum*. Each labium descends along the base of the inner surface of the labia majora, with which it blends in the middle third. In the virgin they are completely hidden by the labia majora and are of a pinkish-red color. In appearance they resemble a cock's comb. They may be continued into the fourchette. The nerve- and blood-supply is the same as for the labia majora. They contain numerous sebaceous and sweat glands.

Describe the clitoris.

The *clitoris* is a curved oblong body, the analogue of the male penis, situated below the anterior commissure. It consists of the glans, the body, and two crura. The glans is a mass of erectile tissue of the size of a small pea, covered by mucous membrane rich in nerve-supply. It is concealed by the prepuce, and is only seen when the labia minora are widely separated. The vessels of the glans are connected with those of the pars intermedia of the bulb. The body, which seldom exceeds an inch in length, curves upward and backward to the anterior edge of the arch of the pubis, where it divides into two crura. It consists of spongy erectile tissue enclosed in a dense capsule. The two crura curve downward along the pubic rami, to the anterior and inner surface of which they are firmly attached. These are also formed of spongy tissue enclosed in a capsule. The slender erector clitoridis muscles extend along their inner sides. The arterial supply is derived from the two terminal branches of the internal pudic. The dorsal vein returns the blood and joins the vesical plexus. The nerve-supply is very abundant, derived from the sympathetic system and from a branch of the pudic nerve. The lymphatics form a plexus around the clitoris, and terminate in the inguinal glands.

Describe the vestibule.

This is a triangular area with its apex immediately below the clitoris, its base formed by the upper margin of the vaginal orifice, and its sides formed by the bases of the labia minora. It is covered by mucous membrane, beneath which is a dense plexus of veins, the pars intermedia. It contains the orifice of the urethra at its base, and five or six depressions or crypts of variable size, the glandulæ vestibulæ minores.

Describe the bulbs of the vagina (bulbi vestibuli).

The *vaginal bulbs* are two oblong leech-shaped masses of veins situated on either side of the vestibule and extending two-thirds

down the sides of the vaginal orifice. They measure, when distended, about 1 inch. Anteriorly they are covered partly by the bulbi cavernosi muscles; internally they are in contact with the mucous membrane of the vagina; and posteriorly they rest upon the triangular ligament. Their vessels communicate anteriorly with each other through those of the pars intermedia. The arterial supply is derived from the internal pudic. The nerves come from the sympathetic.

What is the fourchette?

This is a fold of skin formed by the junction of the labia majora posteriorly. It is the posterior commissure, and is best seen when the labia are widely separated.

What is the fossa navicularis?

When the labia are artificially separated a depression exists anterior to the fourchette. Its anterior margin is formed by the ostium vaginalis and the lower edge of the hymen.

Describe the vulvo-vaginal or Bartholin glands (analogues of Cowper's glands in the male).

They are two compound racemose glands which range in size from a bean to an almond, situated on either side of the vaginal orifice just below the ends of the bulbs of the vagina. They lie behind the anterior layer of the triangular ligament, beneath the superficial perineal fascia, and in front of the transversus perinei muscles. Each has a long duct, the orifice of which can be seen just external to the base of the hymen and internal to the labia minora in the fossa navicularis. They secrete a tenacious mucus which lubricates the parts and which is much increased by coition.

Describe the hymen.

The hymen is a crescentic fold of mucous membrane, containing connective tissue, blood-vessels, and nerves, which surrounds the orifice of the vagina. It is said to be an infolding of the entire vaginal wall, and to disappear completely at parturition (Budin) by being unfolded. There are other shapes aside from the crescentic—*i. e.* annular, with a central opening; perforated, with several small holes; cribriform, or it may be fimbriated at its edges.

The imperforate hymen is a pathological condition. Carunculæ myrtiformes were supposed to be remains of the hymen after labor, but are really tags of tissue resulting from tears and sloughs of the mucous membrane during childbirth.

Describe the vagina.

The vagina is a musculo-membranous canal connecting the uterus with the vulva, situated between the bladder and urethra in front and the rectum and perineal body behind. Its walls lie normally in contact with each other antero-posteriorly. The anterior wall measures 2 to $2\frac{1}{2}$ inches, the posterior 3 to $3\frac{1}{2}$, owing to its higher attachment to the cervix. Its lumen increases from below upward, so that when distended it takes the shape of an inverted truncated cone. Above it completely surrounds the cervix, and below it is attached to the pubis rami. The walls are composed of three coats from within outward—mucous membrane, muscular and connective tissues. The mucous membrane is thrown into folds or rugæ, most marked below. The median longitudinal ridges on the anterior and posterior walls are called the columns of the vagina. Transverse folds extend from these. The epithelium is of the squamous variety. The muscular coat is composed of two sets of fibres—a circular and a longitudinal, the latter being external. The connective-tissue coat serves to connect the vagina with the adjacent organs and to support a plexus of veins.

Vascular Supply.—The *arteries* are derived from the vaginal branches of the anterior division of the internal iliac, from the uterine above and pudendal below,—all anastomosing freely with each other. The *veins* are derived from two plexuses, one internal beneath the mucous membrane, and one in the connective tissue. These communicate with the pudendal and hemorrhoidal plexus below and the plexuses of the broad ligaments above. All the veins are without valves. The *nerve-supply* is derived from the inferior hypogastric plexus of the sympathetic and fourth sacral and pudic nerve. *Lymphatics* enter the inguinal glands below and the internal iliac above.

What are the relations of the vagina?

Anteriorly the vagina is in contact with the bladder at its upper half, and is intimately connected to the urethra throughout its lower half. Posteriorly it is in contact with the rectum at its middle third, being separated from the latter above by the pouch of Douglas and below by the perineal body. Laterally the levator ani muscles are attached to it.

The anterior fornix is $1\frac{1}{2}$ inches from the vesico-uterine peritoneal fold. The posterior fornix lies in contact with the cul-de-sac

of Douglas, and the lateral fornices are in relation to the bases of the broad ligaments.

DISEASES OF THE VULVA.

What may be included under this term?

- I. Malformations;
- II. Tumors and new growths;
- III. Inflammations.

MALFORMATIONS.

Name and describe malformations of the vulva.

- (1) Hypertrophy of the labia majora and minora (the latter called the Hottentot apron). The causes are syphilis, elephantiasis, inflammatory hypertrophy, masturbation. It is usually seen in tropical climates. The *treatment* is surgical when required.
- (2) Hypertrophy of the clitoris. Due to above causes; it is most frequently seen in prostitutes. The *treatment* is surgical.
- (3) Atrophy or absence of the organs of the vulva is either congenital or senile. There is no treatment.
- (4) Hypospadias is absence of the posterior urethral wall.
- (5) In epispadias the anterior wall of the urethra and usually of the bladder is defective.
- (6) Hermaphroditism.

TUMORS AND NEW GROWTHS.

What tumors and neoplasms may be met with in the vulvar region?

Condylomata acuminata (gonorrhœal, warty);
Condylomata lata (syphilitic);
Simple papillomata;
Vulvar cysts (rare);
Vulvar hernia;
Vulvar phlebectasia or varicocele;
Vulvar haematocele and pudendal hemorrhage;
Labial abscess;
Œdema labiorum;
Abscess and cysts of vulvo-vaginal glands;
Hydrocele of the round ligament;

Elephantiasis vulvæ ;
 Fibroma,
 Lipoma,
 Carcinoma,
 Sarcoma,
 Lupus,
 Myxoma,
 Osteoma,
 Enchondroma,
 Neuroma,

rare.

Describe condylomata acuminata.

These are also known as pointed condylomata and gonorrhœal warts. They are warty excrescences found on the inner surfaces of the labia majora and minora and on the posterior commissure, due to gonorrhœal or other irritating discharges. They are always multiple, of a grayish color, and are divided on the summit with pointed lobules. The *treatment* is removal with knife or scissors and cauterization with nitrate of silver.

Describe the condylomata lata.

These are flat, broad excrescences found mostly on the inner sides of the labia majora and around the anus, and are usually covered by a grayish secretion. The *treatment* is antisyphilitic, touching with nitric acid and dusting with calomel powder.

Describe simple papilloma or wart.

This is rare on the vulva.

Treatment.—Removal with nitric acid or the knife.

Describe vulvar cysts.

These rare affections are due to occlusion of one or more of the glands of the vulva. They are usually small and cause no symptoms.

Treatment is excision.

Describe vulvar hernia.

This is a rare condition, "predisposed to" by a pervious "canal of Nuck." It is caused by severe exertion, strains, etc. *Symptoms*.—Correspond to those in the male. Swelling of the labia majora, impulse on coughing, tympanitic percussion. It may consist of gut, omentum, bladder, ovary, or whole uterus. *Differentiation* from vulvar haematocele, hydrocele of the cord, phlegmon-

ous vulvitis, cysts, and abscess of Bartholin's glands. *Treatment.*—Reduction by taxis when possible, and application of a truss; otherwise operative.

Describe vulvar varicocele.

This is commonly seen in pregnancy, and consists of a dilatation of the vulvar veins. The dilatation may be permanent and give rise to great swelling.

Causes.—Pregnancy, tumors, obstinate constipation with straining at stool. *Symptoms.*—Discomfort from the swelling. The latter is irregular in outline, soft and compressible, more prominent when the patient is standing. *Danger.*—Rupture of the veins. *Treatment.*—Very little can be done. Pressure with a T-bandage may be beneficial. Keep the bowels regulated.

Describe vulvar haematocele.

This is a tumor formed by effused coagulated blood in the tissues of the labium or areolar tissue around the vagina, due to rupture of the bulbs of the vestibule. *Causes.*—Predisposed by pregnancy, tumors, varicocele, and labor. Exciting causes are muscular exertions, blows on the labium, and punctures. *Symptoms.*—Sense of discomfort, pain, and throbbing. If the effusion reaches the urethra, there will be obstruction to urination. It is first soft, then hard.

Prognosis.—If small, there will be spontaneous absorption; if large, it may result in hemorrhage or suppuration, especially when the haematocele occurs in pregnancy.

Differentiation from labial abscess, phlegmonous vulvitis, pudendal hernia, suppurative bartholinitis, oedema labiorum. *Treatment.*—During the effusion cold, and pressure later; if small, lead-and-opium wash applied locally. If too large to absorb or if it obstructs labor, open and evacuate it. If suppuration takes place, evacuate and pack with iodoform gauze or wash with 1:1000 bichloride-of-mercury solution, and apply acetate-of-aluminum dressing.

Describe vulvar hemorrhage.

It is due to the above predisposing and exciting causes. *Treatment.*—If due to ruptured vulvar hematocele, open, turn out clots, and pack tightly; apply T-bandage. If due to rupture of a small vessel, ligate.

What is oedema labiorum?

Swelling of the labia is most common in pregnancy. It is also

due to cardiac, renal, and liver diseases, cancer of uterus, wasting diseases, fibroids, and ovarian tumors. *Treatment* directed to cause; puncture if necessary, recumbent position, T-bandage.

Describe abscess of labium. (See PHLEGMONOUS VULVITIS.)

Describe cysts and abscess of vulvo-vaginal or Bartholin's glands.

Cysts are due to occlusion of the duct from inflammation, either of simple or gonorrhœal origin. There may be distension of the duct alone, forming an oblong swelling, or of the gland itself. The causes of *abscesses* are much the same as vulvitis, which they frequently complicate. Gonorrhœa is the most common cause. *Symptoms*.—Pain on pressure, heat, and pruritus. The mouth of the duct is reddened, and remains always of a deeper hue than the surrounding inflamed mucous membrane. The swelling may reach the size of a hen's egg. It is first hard, then fluctuating.

Differentiation from cysts, phlegmonous vulvitis, labial abscess, and vulvar hernia.

Abscess :

Signs of inflammation.
Tenderness on pressure.

Cysts :

No signs of inflammation.
Movable round mass, not tender to pressure.

Abscess :

Circumscribed.

Phlegmonous Inflammation :

Non-circumscribed.

Cyst or Abscess :

No impulse on coughing.
Not reducible.
Dull percussion.
Abscess shows signs of inflammation.

Hernia

History.
Impulse on coughing.
Reducible.
Tympanitic percussion.
No signs of inflammation unless strangulated.

Treatment of Vulvo-vaginal Cyst.—Cut down, remove an elliptical portion of cyst-wall, pack with iodoform gauze, and allow to heal by granulation; or, cut down carefully to the cyst-wall and dissect out the whole sac; then bring the edges of the wound together with catgut and dress antiseptically.

Treatment of Vulvo-vaginal Abscess.—Apply soothing lotions until pus is detected; then make a long incision from top to bottom of the abscess on the inner side of the labium. Curette out the cavity

thoroughly with a sharp curette. Irrigate with 1 : 1000 bichloride-of-mercury solution, pack with iodoform gauze, and dress antiseptically.

Describe hydrocele of the cord.

This is very rare, and is caused by fluid collecting in the process of peritoneum surrounding the round ligament when pervious (canal of Nuck.) It appears gradually, is painless, and sometimes communicates with the peritoneal cavity. It is fluctuating and translucent, and is to be differentiated from hernia and abscess.

Treatment is by aspiration or injections of iodine.

Describe elephantiasis vulvæ.

This usually involves the labia majora and minora, and consists of a connective-tissue hyperplasia. The growth often attains an excessive size.

Treatment is surgical.

INFLAMMATIONS.

What six forms of vulvitis are described?

(1) Simple catarrhal vulvitis, acute and chronic; (2) gonorrhœal vulvitis; (3) follicular vulvitis; (4) diphtheritic vulvitis; (5) phlegmonous vulvitis; (6) gangrenous vulvitis.

Describe simple acute catarrhal vulvitis.

The *causes* are (1) irritating discharges from the vagina and cervix; (2) injury, or friction from exercise; (3) uncleanliness; (4) excessive coitus; (5) parasites, pediculi and ascarides; (6) diabetes; (7) pregnancy; (8) foreign bodies; (9) acute exanthemata; (10) strumous diathesis.

The *symptoms* may be general malaise and mild fever. The local signs are heat, redness, swelling, pruritus; the mucous membrane is at first tense and shiny, later it becomes covered with a glairy excoriating secretion. The inflammation may extend to the urethra and around the anus and nates.

Treatment.—Remove the cause. If parasitic, use unguentum hydrarg.; infusion of quassia, 3ij-Oj, for ascarides. If due to discharges from the vagina and cervix, remove these by hot vaginal douches containing a little alum and zinc sulphate. Always examine for sugar in the urine, and if it is found treat general system with opium or codeine, etc., and apply a solution of sodium hyposulphite, 3ss-Oj, to prevent fermentation of the saccharine urine.

on the vulva. When the inflammation is very acute apply lead-and-opium wash and enjoin rest in bed and hot sitz-baths. Later in the disease applications of nitrate of silver, gr. $xx-\frac{3}{4}$, can be made every two days.

Describe simple chronic catarrhal vulvitis.

This is the most common form in children.

Causes.—Strumous diathesis, ascarides, continuation from acute vulvitis.

Symptoms.—Pruritus, burning micturition, discomfort in walking, discharge from vulva.

Treatment.—Tone up the general system by tonics; locally, lead-and-opium wash can be applied first, followed later by nitrate of silver, gr. $xx-\frac{3}{4}$, and boric-acid powder.

Describe gonorrhœal or purulent vulvitis.

The *cause* is specific infection, due to the gonococcus of Neisser.

The *symptoms* are its sudden onset, pain, heat, redness, and swelling, followed rapidly by a profuse purulent, offensive excoriating discharge. It is frequently complicated by urethritis, bartholinitis, and vaginitis. Labial abscess is a common complication. The pus infects any mucous membrane with which it is brought in contact. The orifices of Bartholin's glands are reddened.

Differentiation.—

Gonorrhœal Vulvitis:

More severe.	Less severe onset.
More fever, pain, and œdema.	Less fever, pain, and œdema.
Urethra and vagina often involved.	Urethra and vagina not complicated.
Gonococci.	No gonococci in discharges.
Gonorrhœal warts.	
Gonorrhœal rheumatism.	
Bartholin's glands and ducts inflamed.	Bartholin's glands and ducts not usually affected.

Simple Vulvitis:

Treatment.—Hot sitz-baths; rest in bed; bowels moved. Local: Irrigation with bichloride; paint with nitrate of silver, gr. $xx-\frac{3}{4}$; powder with bismuth, calomel, or iodoform, and separate labia with a little lint.

Describe follicular vulvitis.

It occurs only in adults.

The *causes* are uncleanness, pregnancy, vaginitis, eruptive diseases, excessive venery.

The *symptoms* are increased secretion, burning and itching, heat, and soreness between the labia. The mucous membrane is red, elevated in patches; lips swollen; villi which bleed easily; or there may be little red prominences which break down, discharge, and leave little ulcerated points.

Treatment.—Cleanliness, lead-and-opium wash, nitrate of silver, gr. $\frac{1}{2}$, bismuth.

Describe diphtheritic vulvitis.

This is really diphtheria of the vulva, and a complication of the general disease. The patches of false membrane are like those found in the throat, and resemble wash-leather.

Treatment.—General: for diphtheria. Local: antiseptic.

Describe phlegmonous vulvitis.

Causes.—Traumatism, chancroidal ulcers, irritating discharges, furuncles, acute exanthemata.

Symptoms.—Heat, pain, swelling, redness, induration, suppuration.

Differentiation.*—**Phlegmonous Vulvitis:***

Signs of inflammation.

Dulness on percussion.

No impulse on coughing.

Not reducible.

History.

Pudendal Hernia:

No inflammation, unless strangulated.

Tympanitic.

Impulse on coughing.

Reducible.

History.

Phlegmonous Vulvitis:

More gradual onset.

First hard, then soft.

Not frequent during pregnancy and parturition.

Not preceded, as a rule, by varicose veins.

Vulvar Hæmocele:

Sudden onset.

First soft, then hard.

More frequent during pregnancy and parturition.

Preceded by varicose veins.

Phlegmonous Vulvitis :

Signs of inflammation.
Opaque.

Hydrocele of the Cord :

No inflammation.
Translucent.
May communicate with abdominal cavity.

Phlegmonous Vulvitis :

Not circumscribed.

Abscess of Bartholin's Glands :

Circumscribed.

Describe gangrenous vulvitis.

Usually indicates a low vitality of the system. It is sometimes a complication of pregnancy, puerperal septicæmia, severe cases of scarlet fever, measles, and continued fevers.

Symptoms.—Severe constitutional disturbance, labia dark-colored and swollen. A patch of purplish hue becomes indurated at edges and ulcerates. The gangrenous process spreads, and discharges a foetid, ichorous fluid.

Treatment.—Tonics. Local: Antiseptics and cauterizing with nitrate of silver or actual cautery.

What is the most common of the eruptive diseases that may appear on the vulva?

Eczema.

Give the etiology, symptoms, and treatment of eczema vulvæ.

It is most common near the climacteric and in fleshy women. By far the most common *cause* is diabetes, from the fermentation of the saccharine urine. Other causes are irritating discharges, scratching from pruritus vulvæ. There is a predisposition if a gouty or rheumatic diathesis exists.

Symptoms and Appearances.—It usually begins on the inner surfaces of the labia in the shape of small vesicles and abrasions. These extend to the other parts of the vulva. Intense pruritus is a prominent symptom. Later there are redness, heat, and numerous little vesicles rupture and discharge a serous, sticky fluid. Finally, the labia become dry, hard, fissured, and swollen, covered with crusts and scales; the mucous membrane is white and sodden, especially at the anterior commissure.

Treatment.—If due to diabetes, frequent applications of a solution of hyposulphite of soda, 3ss-Oj, will relieve the pruritus and allay the inflammation. Give codeine, gr. $\frac{1}{4}$, *t. i. d.*, internally. If due to other causes, lead-and-opium wash in the acute stage is

good. In the chronic form an ointment of 8 per cent. ichthylol in lanoline is highly recommended, or 5 per cent. creolin emulsion.

What ulcerations may be met with in the vulva?

Hard and soft chancres, non-specific ulcerations, sometimes in childhood and prostitutes, forming small sensitive sores around the entrance of the vagina and hymen.

CUTANEOUS AFFECTIONS OF THE VULVA.

What forms of skin diseases may affect the vulva?

Alopecia, herpes labialis, prurigo, acne, simple erythema, erysipelas, pityriasis versicolor, scabies, pediculus pubis.

What two forms of parasites may be found on the vulva?

Scabies (rare), pediculi pubis (common).

Give etiology, symptoms, and treatment of scabies.

Due to the presence of the acarus scabei. This is rarely found on the vulva, but may complicate the general infection.

Symptoms.—Intense pruritus; the presence of the burrows on the vulva, with others on the hand and between the fingers, will lead to the diagnosis.

Treatment.—Sulphur ointment, gr. $\text{xx}-\frac{3}{4}$ j, or combined with balsam of Peru.

Give the etiology, symptoms, and treatment of pediculi pubis.

This is due to the presence of the pediculi pubis, or crab-louse, under the skin. It is conveyed by direct infection nearly always.

Symptoms.—Intense itching; presence of small red spots, in which the parasite can be seen with its ova and excrement. The eruption resembles eczema.

Treatment.—It is well to begin the treatment of most eruptions on the vulva with a 5 per cent. solution of carbolic acid as a lotion. Mercurial ointment and the tincture of delphinium will destroy the parasites.

NERVOUS AFFECTION OF THE VULVA.

Describe pruritus vulvæ.

Pruritus vulvæ is an intense itching and burning of the vulva. It is a common symptom of a large number of the eruptive and inflammatory diseases just considered, but the symptom may exist without any apparent anatomical lesion.

What are the causes?

(1) Irritating discharges: (a) Urine; (b) vaginal; (c) uterine; (d) urethral; (e) from the vulvo-vaginal glands and from Skene's ducts.

(2) Diabetic urine;

(3) Eruptions;

(4) Masturbation;

(5) Uncleanliness;

(6) Neurotic influences, met with most commonly during pregnancy;

(7) Parasites;

(8) Ascarides;

(9) Vegetable parasites:

(10) Anything giving rise to a congestion may cause pruritus:

- (a) Pregnancy;
- (b) Tumors;
- (c) Menopause;
- (d) Carcinoma uteri.

Symptoms.—Intense itching on the surface of the vulva, at first localized over a limited area, the anterior commissure, inner sides of labia majora and nymphæ, later extending to all the external organs. The sensation is not generally constant, except after the menopause, being brought on or increased in severity by exercise or coitus. It may only appear at night or early in the morning, and is usually much increased by the warmth of bed-clothes. In young women the symptom is generally intermittent; after the menopause it becomes more intractable and constant.

Treatment.—Directed to the cause. If of parasitic origin, removal. If diabetic urine, hyposulphite of soda locally, 3ss—Oj, and codeine or salicylate of soda internally. If due to irritating discharges, these must be treated. A plug of dry borated cotton pushed into the vagina, to prevent the contact of a discharge, will often afford great relief. Build up the system; regulate diet if there is a gouty diathesis; frequent hot sitz-baths; 2-3 per cent. carbolic solution applied locally; 4 per cent. cocaine solution; nitrate of silver; boric-acid dusting powder.

R. Acidi acetici, f³j;
Glycerini, f³ij.—M.
Sig. Apply locally.

What is hyperæsthesia vulvæ?

(This condition was first described by Thomas). It consists of an excessive sensibility of the nerves supplying some portions of the vulva—labia majora, minora, vestibule, or urethra. It is not very frequent.

Give its etiology, symptoms, and treatment.

It occurs most commonly about the menopause, and is predisposed by an hysterical state. Chronic vulvitis and irritable urethral caruncles may be exciting causes. Often no cause can be found.

Symptoms.—Dyspareunia, or painful intercourse, is usually the most prominent symptom, sometimes pain in walking or on bathing the parts. The general health may suffer, and a state of melancholia may be developed.

Treatment.—Change of scene unsatisfactory, better separation from husband, tonics, bromides. Locally: Carbolic acid, 3 per cent.; cocaine, cyanide of potash (with caution).

Define vaginismus.

Vaginismus is an intense hyperæsthesia of the vulvar outlet and spasm of the constrictor vaginae muscle, brought about by attempted coitus. The spasm may become general.

What are its causes?

It may be due to some pathological lesion of the vulvar outlet or hymen, to disease of the uterus, ovaries, or tubes, or it may be purely nervous, or it may be caused by a rigid hymen, small vulvar orifice, or by the vulva being placed too high under the symphysis. Sometimes tender spots are found on the hymen, due to inflammation of the papillæ. In nervous women inability of the male to perform the sexual act is sometimes the cause.

What are its symptoms?

Excessive pain and muscular spasm around the vulva, induced by attempted coition or any endeavor to pass the vulvar opening.

What is the treatment?

Excising the hymen and uniting the edges to prevent granulation, afterward inserting a glass plug; forcible dilatation under anæsthetics and introduction of glass plug; local applications of cocaine, nitrate of silver, tr. iodine, hot douches, and sitz-baths. If due to diseases of uterus, rectum, etc., treat these.

IRRITABLE URETHRAL CARUNCLE.

Give its pathology, etiology, symptoms, and treatment.

Pathology.—Urethral caruncles appear as bright-red vascular tumors projecting from the meatus or extending up into the urethra. They are exceedingly painful to the touch and bleed easily. They consist of hypertrophied papillæ and areolar tissues. They are very richly supplied with blood-vessels and nerves. They may be single or multiple, sessile or pedunculated.

Etiology.—The cause is unknown. They occur in young and old alike; often follow acute urethritis or chronic gonorrhœal urethritis; may be due to a pathological state of the urine.

Symptoms.—Severe pain on urination may be accompanied by spasm of muscles of vulva and sphincter ani; pain on coition and walking; the constitution may run down. Excessively painful to the touch.

Differentiation from prolapse of urethral mucous membrane, polypi, and venereal warts.

Treatment.—Ligate and remove with knife. Prognosis is good if single, worse if multiple. Cauterizing may be employed, preceded by dilatation of the meatus under anaesthesia.

COCCYGYODYNIA OR COCCYODYNIA.

Describe coccygodynia or coccydynia.

Coccygodynia is a painful affection of the muscles, tendons, and nerves of the coccyx, due most frequently to childbirth, but may be caused by traumatism, with fracture and fixation of the coccyx in an abnormal position, or dislocation. It may be the expression of disease in other organs, as the uterus, ovaries, and rectum. It may be rheumatic or brought on by exposure to cold, or it may be hysterical. There may or may not be disease of the bone.

Symptoms.—Pain at the end of the spine, inability to rise from sitting posture, due to the stretching of the fascia; painful defecation; painful coitus; pain on walking or sitting down.

Diagnosis.—This is made by placing a finger in the rectum and moving the bone, or by pressure on the coccyx from the outside.

Treatment.—If hysterical or due to disease of other organs, they must be treated. If rheumatic or gouty, these conditions must be attended to. Counter-irritation by actual cautery or blisters; electricity. If these fail, operative measures: (1) Separation of the

coccyx from tendinous and muscular attachments ; (2) total extirpation.

PROLAPSUS URETHRÆ.

Describe prolapsus urethræ.

This is a prolapse of the urethral mucous membrane, with proliferation of the underlying connective tissue ; slight, is common ; considerable, is rare. It is met with in old, feeble women and young girls before puberty. It appears as a protrusion entirely or partially encircling the meatus. After existing some time it becomes inflamed and red, bleeding readily.

For what can this be mistaken ?

Urethral caruncle, polypi, carcinoma.

How would you differentiate it from irritable urethral caruncle ?

It entirely encircles the meatus as a rule, while caruncle does not. It is less painful ; may be reducible.

Symptoms.—Painful and frequent micturition. It may give rise to urethritis and cystitis. Pruritus may be set up by the discharge.

Treatment.—If slight, astringents ; if severe, anæsthetize the patient ; draw down the prolapsed mucous membrane with toothed forceps and remove with scissors. Then sew the edges of the mucous membrane together ; afterward catheterize the bladder and do Emmet's buttonhole operation. Another method is to draw down the mucous membrane, ligate, and remove with a knife or cautery.

DISEASES OF THE VAGINA.

What diseases may be met with in the vagina ?

Inflammations, cysts, ulcerations, malformations, displacements.

INFLAMMATIONS OF THE VAGINA.

Describe vaginitis occurring in children and before puberty.

May be acute or chronic. *Acute* (rare), due to injuries and rape (gonorrhœal). Symptoms and treatment are the same as for acute vulvitis. *Chronic* (more common) may continue from acute or be caused by dentition, errors of digestion, pin-worms, extension from vulvitis.

Symptoms.—Local irritation, milky discharge, unlike the secretion from the vulva. The vulva is usually reddened and inflamed.

Treatment.—Constitutional tonics. *Local:* Cleanliness; irrigation with 1 : 1000 bichloride if gonorrhœal, or weak bichloride with lime-water.

What are the varieties of vaginitis in adults?

(1) Simple catarrhal vaginitis { acute,
 (2) Gonorrhœal ;
 (3) Granular, papillary ;
 (4) Ulcerative, adhesive, or senile ;
 (5) Cystic ;
 (6) Follicular.

Give the etiology, symptoms, diagnosis, and treatment of simple acute catarrhal vaginitis.

Causes.—*Predisposing*, anything leading to congestion of the parts, diseases of heart, lungs, and liver, abdominal tumors, pregnancy, menstrual epoch, menopause, chronic constipation, etc. *Exciting*, exposure to cold during menstruation; irritating discharges from the cervix; cancer; putrid contents of uterus; sloughing placenta or tumors; abuse of sexual intercourse; too hot or too cold douches; use of local irritants, iodine, etc.; foreign bodies, sponges, pessaries, etc.; lacerations and contusion during parturition; acute exanthemata.

Symptoms and Diagnosis.—Burning heat and throbbing in the vagina, sometimes severe pelvic pain of a bearing-down character; offensive purulent leucorrhœa; burning and excoriation at the vulva; sensation of weight in the perineum; frequent micturition. The mucous membrane is at first hot, dry, red, and swollen. Within twenty-four hours there is an acrid discharge, which becomes rapidly purulent and excoriates the vulva. Through a speculum the mucous membrane is found red and congested with abrasions and ulcerations on the surface.

Complications.—Extension of the inflammation to adjoining organs—uterus, Fallopian tubes, peritoneum, Bartholin's glands, urethra, bladder, ureters, and kidneys.

Treatment.—Put the patient in bed on a low diet. Prescribe salines internally, and use opium in alkaline diluents for the bladder. Vaginal injections three or four times a day of a weak solution of

liq. plumbi subacetatis or boric acid in warm water. Boric-acid dusting powder on the vulva. Later touch the vagina with nitrate of silver, gr. $\text{xx}-\frac{3}{4}$, through a speculum.

Give the etiology, symptoms, and treatment of simple chronic catarrhal vaginitis.

Etiology same as acute. From chronic leucorrhœal discharges, as in phthisis, chlorosis, anaemia.

Symptoms, same as acute, but less severe. Difficult to differentiate from gonorrhœal: in 90 per cent. gonorrhœal.

Treatment.—Daily douches of hot water containing alum. sulph. $\frac{3}{4}$ -Oj, zinc sulph. $\frac{3}{4}$, or boric acid $\frac{3}{4}$ -Oj. Touch vagina once in three days with nitrate of silver, gr. $\text{x}-\text{xxx}-\frac{3}{4}$.

What are the points in which gonorrhœal vaginitis differs from simple catarrhal?

(1) Symptoms more severe; (2) onset more sudden; (3) greater liability to infect other organs, such as urethra, bladder, uterus, Fallopian tubes, etc.; (4) redness and excoriation about orifices of Bartholin's glands are more common; (5) history of infection; (6) gonorrhœal warts and buboes; (7) presence of gonococcus of Neisser.

What is the frequency of gonorrhœal vaginitis as compared with other inflammations?

Between 80 and 90 per cent. of all cases of vaginitis are probably of gonorrhœal origin.

Is the vagina as apt to become inflamed as other genital organs?

No, because in character its mucous membrane resembles the skin. A gonorrhœal infection will frequently pass directly from the vulva and urethra to the cervix uteri without setting up a vaginitis.

What is the treatment of gonorrhœal vaginitis?

General treatment is the same as for catarrhal vaginitis. Irrigate vagina thoroughly with 1:1000 bichloride of mercury. It should be swabbed out through a speculum. To prevent extension of the inflammation to the cervix it is well to paint the endometrium with iodized phenol (iodine gr. xl to carbolic acid $\frac{3}{4}$). Then swab out the vagina with nitrate of silver, gr. $\text{xx}-\frac{3}{4}$. Powder the surface well with iodoform. Separate the walls with tampons soaked in iodoform, glycerin, and chloral solution.

What are the great dangers of gonorrhœal vaginitis?

(1) Infection of the endometrium ; (2) infection of the Fallopian tubes and the formation of *pyosalpinx* and ovarian abscess ; (3) pelvic peritonitis.

What are the causes, symptoms, and treatment of granular vaginitis?

Causes.—It may result from either of the preceding forms, but is almost always associated with pregnancy.

Symptoms.—The subjective symptoms are similar to those of simple vaginitis. On examination numerous granulations are felt scattered over the mucous membrane and cervix. In appearance they resemble a raspberry. The granulations are due to a swelling of the papillæ, either individually or in groups, caused by round-cell infiltration. The epithelium on the surface is shed.

Treatment.—Sulphate-of-copper solution, 10 per cent., applied to granulations ; crude pyroligneous acid, poured into the vagina through a Fergusson speculum.

Describe ulcerative vaginitis.

The condition is usually met with in women past the menopause, and affects chiefly the epithelium. It consists of a shedding of the epithelium over papillæ, leaving raw, red, angry-looking patches. It usually affects the upper third of the vagina.

Symptoms.—These are very slight. There may be a little thin bloody discharge and severe pain. It tends to form adhesions between the vaginal walls and between the vaginal walls and cervix.

Treatment.—Crude pyroligneous acid poured into the vagina through a Fergusson speculum or bivalve ; the vaginal walls and escoriated patches dusted with iodoform, and kept separated by a strip of iodoform gauze or a tampon.

Describe cystic vaginitis.

Cystic vaginitis is a rare condition, the cause of which is unknown. It consists of numerous little cysts which contain gas or fluid scattered over the vaginal walls. These are produced by a swelling of the rugæ into folds, adhesion of the edges, and the formation of fluid or gas in the interstices. The fluid is clear and honey-like. The cysts may be the size of a pea.

Describe follicular vaginitis.

Follicular vaginitis is generally of gonorrhœal origin, and is due to inflammation and occlusion of the mouths of the follicles, usually

at the upper portion of the vagina. Retention cysts are thus formed, and round-cell infiltration takes place in the tissue surrounding the gland. On digital examination these cystic follicles feel like shot under the surface.

Symptoms.—There is a thick leucorrhœal discharge.

Treatment.—Open each cyst with a knife and touch with nitrate of silver.

VAGINAL CYSTS.

Define and give the etiology of vaginal cysts.

These are small cysts which appear on the wall of the vagina, usually near the vulva, but they may be seen at the upper portion. They are generally due to the collection of fluid in the ducts of Grtner where pervious. Grtner's ducts are the horizontal tubes of the parovarium which extend toward the uterus and are lost upon the anterior vaginal wall. These cysts are usually single, and contain a clear, serum-like fluid or a dark, chocolate-colored material. Retention cysts are sometimes formed by the enfolding and adhesions of the folds of the vagina.

Differentiation.—Cysts of Grtner's duct may be mistaken for cystocele, urethrocele, and prolapse.

Symptoms.—Small cysts cause no symptoms. When large they press upon neighboring organs.

Treatment.—Small, none; large, total extirpation, or excising a piece of the sac-wall and sewing the edges to the vaginal wall.

VAGINAL ULCERS.

What varieties may be met with?

- (1) Specific, hard and soft chancres;
- (2) Non-specific, resulting from one or other of the preceding inflammatory conditions.

MALFORMATIONS OF VAGINA.

Define atresia and stenosis.

A complete or partial obstruction in the genital tract. The word "atresia" means the state of being imperforate, but is sometimes erroneously used in place of stenosis for partial closure.

Describe the varieties and sites of atresia.

It is congenital or acquired. In the congenital form the sites

are the labia minora, hymen, inner part of vagina, cervix uteri. In the acquired form the sites are the vagina and cervix uteri.

In the congenital form the labia minora are usually incomplete, permitting the passage of urine. The hymen is dense and thickened.

Atresia of Vagina.—The affection is due to atrophy or lack of development of the ducts of Müller. There may be one or more transverse membranes. The vagina may be entirely obliterated or replaced by a cord. It may be double, or one tube alone developed. Septa may be at any portion, but usually near the uterus. They may be single or multiple.

In the cervix the atresia may be at the os internum or throughout the whole cervical canal.

What are the causes in the acquired form ?

(1) Injuries ; (2) chemical agents ; (3) prolonged labor and injuries ; (4) ulceration and adhesion of surfaces ; (5) adhesive vaginitis ; (6) gangrene.

May occur at any time after puberty.

The *symptoms* are due to retained menstrual flow and interference with coition. Therefore there are no symptoms before puberty and after the menopause.

Amenorrhœa.—There are signs of menstruation, but no flow, and at each successive menstrual epoch the symptoms become worse and more prolonged, the intervals shorter. There is a sense of fulness and bearing down in the pelvis, and cramp-like pain ; finally, the retained blood forms a tumor with pressure symptoms of the rectum and bladder.

What are the physical signs ?

Inability to introduce the finger into the vagina. Rectal examination reveals an absence of the vagina, a fibrous cord, or a tumor from the distension of the vagina with blood.

What are the results ?

If the atresia is at the hymen or vulva, a very large tumor may form. The uterus is generally unaffected, but may be distended, forming a haematometra. The tubes may be filled with blood—haematosalpinx. The hymen may rupture and let out the blood, or there may be a rupture of the vagina, uterus, or Fallopian tubes, resulting in haematocele, peritonitis, and septicæmia.

If the atresia is nearer the uterus, we get hæmatometra and hæmatosalpinx.

What is the character of the retained blood?

Before the menopause it is dark, grumous, and chocolate-colored, having a heavy peculiar odor. After the menopause it is clear, greenish, and honey-like.

Differentiation from uterine fibroids, malignant growths, ovarian cysts, hæmatocoele, and pregnancy.

Treatment, Operative.—If the atresia is at the hymen, make a crucial incision and evacuate the blood, either slowly or rapidly, under strictly antiseptic precautions. Irrigate thoroughly and insert a glass plug. If the atresia is higher up, same treatment. If there is absence of vagina, but the uterus and ovaries can be palpated, make an artificial vagina with a knife and insert a glass plug. When the atresia is at the cervix the retained blood should be aspirated slowly to prevent rupture of a distended tube. When thoroughly evacuated, dilate the cervix and use copious irrigation; insert a glass plug. The irrigations should be frequently repeated.

DISPLACEMENTS OF THE VAGINA.

What are they?

Prolapse, rectocele, cystocele, enterocele.

Describe prolapse of the vagina.

When there is a pouching of the relaxed walls of the vagina into its own canal, so that it rolls down toward the vulva, the condition is known as prolapse. The condition is rare without coincident descent of the bladder (cystocele) and rectum (rectocele), owing to the attachment of the vagina to these organs. Redundancy of the posterior wall without rectocele is more common than of the anterior without cystocele.

Pathology.—Any influence which impairs the tone of the vaginal walls, such as *subinvolution*, or which destroys its lower support, as in *lacerations of the perineum*, will tend to induce this affection. It is very rare in women who have not borne children, and is frequently associated with uterine prolapse.

Causes.—Repeated parturitions, rupture of perineum, senile atrophy, subinvolution, violent exertion of abdominal muscles.

Symptoms.—It may be acute, due to sudden violent exertion, or chronic, the result of months or years. It causes a sense of dia-

comfort in the vagina, bearing-down feeling, sense of heat and fulness at the vulva. Tendency to become fatigued. Presence of a tumor is felt by exploration. The mucous membrane may be normal, dark purple color, eroded, or resembling skin.

Treatment.—Local astringents on tampons introduced daily in the vagina; pessaries; abdominal supports; surgical operations.*

Define rectocele.

This is a prolapse of the posterior wall of the vagina, carrying with it a portion of the anterior wall of the rectum. It protrudes from the vulva and may become quite large. The *causes* are the same as for prolapse.

Symptoms.—The rectal pouch becomes filled with impacted faeces, is irritated, and gives rise to tenesmus, discharge, constipation, hemorrhoids. The finger introduced into the rectum will decide the diagnosis.

Treatment.—Same as for prolapse. When large, some form of posterior colporrhaphy is always performed.

Define cystocele.

This is a prolapse of the anterior wall, dragging with it the closely adherent bladder and urethra.

Causes.—Same as for prolapse. When the vagina ceases to give support to the base of the bladder, to which it is attached, a cystocele results.

Symptoms.—Diagnosis can be made by passing a sound into the bladder. Cystitis due to fermentation of the urine remaining in the pouch; vesical tenesmus; burning on urination. It may form a tumor of considerable size, protruding through the vulva.

Treatment.—When large, some form of anterior colporrhaphy; when small, same as for prolapse. A Gehrung pessary will effectually keep up a prolapsed anterior wall.

Describe enterocele.

This is very rare, and consists in the descent of a portion of small intestine into the pelvis, encroaching on the vaginal canal. Usually a deep Douglas cul-de-sac. It may attain considerable size. It is of particular importance during parturition, when the gut may become strangulated.

* Colporrhaphies. (*See Perineal Operations.*)

THE PERINEAL BODY AND PELVIC FLOOR.

ANATOMY.

Describe the perineal body.

The perineal body is a mass of fibro-muscular tissue filling in the space between the lower ends of the rectum and vagina. It is an irregular four-sided pyramid. Two sides rest against the posterior vaginal wall, one against the anterior wall of the rectum, and one is covered by the skin and fascia between the posterior commissure and the anus.* The perineal body is $1\frac{1}{2}$ inches in length, $1\frac{1}{2}$ inches in width, and $\frac{1}{4}$ inch antero-posteriorly. Above it becomes continuous with the recto-vaginal septum, and laterally it is bounded by fat. The whole body lies below a line joining the tip of the coccyx and the subpubic ligament.

The muscles entering into its formation are the bulbo-cavernosus, the transversus perinei, and the sphincter and levator ani. Its function is to give a fixed point to many muscles, to prevent pouching forward of the rectal wall, and to give strength to the pelvic floor. It also indirectly supports the anterior vaginal wall and prevents cystocele.

The *arterial* supply of the perineum is derived from branches of the internal pudic; the *nerve-supply* from the pudic nerve; the veins terminate in the pudic veins and the lymphatics in the inguinal glands.

Describe the pelvic floor.

The pelvic floor includes all the soft parts which close the outlet of the pelvis: rectum, vagina, bladder, levator ani, and coccygei muscles, fascia above and below them, perineal body, ischio-rectal fossæ, and integument.

Examining the structures from above downward, the pelvic and recto-vesical fasciæ are first seen. The pelvic fascia is attached to the pelvic brim and to the tendinous band called the "white line" which extends from the lower portion of the symphysis pubis to the ischial spine. The recto-vesical fascia is the continuation of the pelvic, extending downward and inward from the white line, covering the levator ani muscles and uniting in the median line with its fellow of the opposite side. Posteriorly it is continuous with the fascia covering the pyriformis muscle. It is pierced by the vagina and rectum, being prolonged downward upon each in

* This skin is often erroneously spoken of as the perineum.

the form of a sheath. The obturator fascia is the other division of the pelvic fascia at the white line, and covers the obturator muscle.

Beneath the pelvic and recto-vesical fascia is the muscular diaphragm, formed by the levator ani in front and the coccygei behind.

The *coccygei* are two thin, triangular muscles which arise from the ischial spine and lesser sacro-sciatic ligament, and are inserted into the lateral borders of the lower segment of the sacrum and to the sides and anterior surface of the coccyx. The two *levatores ani*, meeting with each other in the median line, form a concave muscular diaphragm across the outlet of the pelvis. Each arises from the posterior aspect of the pubis, from the "white line," and from the inner surface of the ischial spine. They extend inward to the median line, uniting with each other and surrounding the rectum and vagina, to which they are firmly attached.* Behind the vagina the fibres form part of the perineal body and blend with the deep transversus perinei muscles. Some fibres are attached to the coccyx.

The under surface of the levator ani is covered by a thin membrane called the anal fascia, which has its attachment on either side to the obturator fascia, and in the median line to the opposite lamina and to the rectum and vagina. Below the anal fascia the remainder of the pelvic outlet is filled by the perineal body and the ischio-rectal fossæ.

What muscles enter into the formation of the perineal body?

The *bulbo-cavernosi* arise posteriorly in the perineal body and encircle the vaginal bulbs. Each divides into three slips—one going to the posterior surface of the bulb, another to the lower surface of the corpus cavernosum, and the third being lost on the mucous membrane of the vestibule. Their action is to compress the bulbs.

The *transversus perinei* muscles are divided into two layers, a superficial and a deep, separated by the anterior layer of the triangular ligament. They arise from the rami of the ischium and the anterior triangular ligament, and are inserted into the median raphé of the perineal body.

The *sphincter ani* arises from the tip of the coccyx and superficial fascia, and is inserted into the perineal body.

The *levator ani* has been described. It is divided into an anterior or *pubo-vaginal* portion, which surrounds the vagina and

* The vagina pierces the pelvic floor at an angle of about 60°.

acts to contract the outlet, and a posterior portion, the obturator-coccygeal, surrounding the rectum.

The urethra is surrounded by the *compressor urethrae* muscle (called by some the *sphincter* or *constrictor vaginalis*), which forms a figure of 8 around the *vagina* and *urethra*.

Describe the ischio-rectal region.

This corresponds to the portion of the pelvic outlet behind the perineal body. It contains the termination of the rectum and a deep fossa filled with fat on either side of the latter, between it and the tuberosities of the ischium. The ischio-rectal fossæ are pyramidal in shape, with the apex directed upward. They are one inch in breadth and two inches in depth, bounded internally by the levator ani, sphincter ani, and coccygei muscles, externally by the tuberosities of the ischium and the obturator fascia; anteriorly they are limited by the division of the superficial and deep perineal fascia, posteriorly by the gluteus maximus and great sacro-sciatic ligament.

The external covering of the pelvic floor is made up of skin and fascia.

Describe the superficial perineal fascia.

It is separated into two layers—a superficial and a deep. The superficial or subcutaneous layer contains considerable adipose tissue and the superficial perineal and hemorrhoidal vessels and nerves. The deep layer is attached to the rami of the pubes and ischium posteriorly, and curves around the transversus perinei to become continuous with the anterior layer of the triangular ligament.

The *triangular ligament*, or deep perineal fascia, is composed of two layers, and closes the front part of the outlet of the pelvis. It is attached to the under surface of the *symphysis* and to the *pubic* and *ischial* rami. It is divided in the middle by the *vagina*.

LACERATIONS OF THE PERINEUM AND PELVIC FLOOR.

What are the chief facts to be borne in mind in the consideration of lacerations of the perineum?

A thorough knowledge of the anatomy and functions of the perineum and pelvic floor is necessary to fully understand the importance of these lesions. The levator ani muscles and pelvic fascia

are the most important features in the support of the pelvic viscera, acting as a tight sling of fibres across the pelvic outlet. Laceration or overstretching of these fibres, especially posteriorly at their attachment to the rectum, results in a *relaxation* of the outlet through which the superincumbent structures roll out, causing rectocele, cystocele, prolapse of the vagina and uterus.

What are the causes of lacerations of the perineum?

Parturition is by far the most important *cause*; acting, when there is a large head, in occipito-posterior position, rotated into the hollow of the sacrum; when there is a narrow pubic arch; in elderly primiparae, with rigidity of the parts; the careless use of forceps, etc. Besides parturition, lacerations may, rarely, be produced by external violence, such as falling astride sharp objects. Rape in children sometimes results in a laceration, as may also syphilitic ulcerations of the perineal body. Occasionally there is a loss of the perineal body due to senility, debility, and subinvolution.

What are the varieties of perineal lacerations? *

(1) Laceration into the body of the perineum, including slight tears and those extending to the sphincter without injury to the levator ani. (2) Rupture of the perineum with radiating tears into the sulci on either side of the posterior columns of the vagina. These are the Y-shaped tears which leave the tip of the posterior column as a tongue of tissue. The laceration may extend upon one or both sides. (3) Rupture of perineal body through the sphincter ani without laceration of the levator ani. (4) Laceration through the sphincter ani with injury to the levator ani. (5) Invisible, concealed, or subcutaneous ruptures when the levator ani muscles and fascia have been overstretched and torn, resulting in subinvolution and relaxation of the vaginal outlet. These kinds of laceration are the most frequent and of the greatest importance. They are generally unrecognized.

How would you test for relaxation of the vaginal outlet and the extent of laceration?

By placing two fingers in the vagina and pressing downward and outward, at the same time telling the patient to bear down as if at stool. If relaxation exists, the walls of the vagina will be seen to bulge downward and protrude. It is well to place a pledget of cotton over the anus to prevent evacuation of faeces. To test the

* Taken from Dr. Cleveland's classification.

extent of laceration place the thumb against the anterior margin of the anus, and the tip of the finger just within the vagina, and bring the two together.

What is the significance of rupture of the perineum?

Septicaemia may be an immediate consequence, due to the exposure of the extensive raw surface, rich in blood- and lymph-vessels, to the lochial fluid.

Tears through the sphincter will lead to complete or partial incontinence of faeces. Tears involving the levator ani muscles and fascia will result in subinvolution, relaxation of the vagina, prolapse of uterus and vagina, rectocele, cystocele, subinvolution of the uterus, and displacements. Tendency to abortion, tenderness at the site of the tear, may result. Sometimes air enters the vagina and escapes with a noise.

What are the symptoms of lacerated perineum?

These are due to the above consequences, and have been described under *Rectocele* and *Cystocele*.

OPERATIONS.

What are the two classes of operations?

Primary and secondary. The primary operation, or immediate repair of the injury at the close of labor, belongs to the province of obstetrics. It should be the object in performing the secondary operation to reduce the tear by proper denudation to its original condition—*i. e.* the recent form—and then to suture.

How long should you wait after labor before performing the secondary operation?

It is better to wait until involution is complete, and operate from five to six months after confinement.

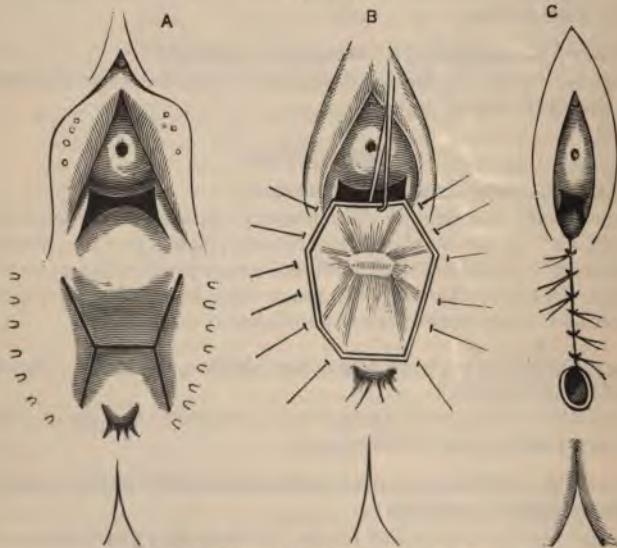
What are the preliminary preparations and instruments required for a primary operation?

Regulate the patient's diet for two or three days previous to the operation. Give a mild laxative for two nights before to secure complete evacuation of the bowels. An enema should be administered and the bladder emptied immediately before operating. The patient is then anaesthetized and placed in the lithotomy position, the knees being held up by a Clover's crutch. The vulva should be shaved and thoroughly cleaned with 1:1000 bichloride, and the

vagina thoroughly swabbed out with the same solution. The abdomen and limbs of the patient are surrounded with towels wrung out of 1 : 1000 bichloride.

The necessary instruments are 2 pairs of sharp-pointed scissors, straight and curved on the flat; 1 pair of straight, blunt-pointed scissors; 1 pair of sharp-pointed straight scissors, curved on the side; 4 tenacula, Emmet's; 2 bullet forceps; 6 sponge-holders; 1 needle-holder; 2 mouse-toothed forceps; 1 plain dissecting forceps; 1 pair of tissue forceps; 6 pairs of artery forceps; 1 counter-pressure hook; 1 shield; 1 Emmet's twisting forceps; 12 perforated shot; 1 shot-compressor; 12 needles, small curved, large

FIG. 23.



Method of Repair adopted in Previous Cases.

curved, spear-point, long, straight; 1 Peaslee's needle; sterilized catgut, sizes Nos. 2 and 3; small-size silk; silkworm gut; silver wire, No. 24; Kelly's rubber pad.

What are the most important operations?

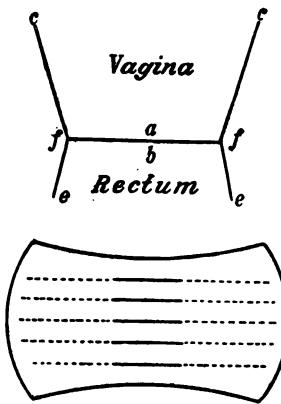
Perineorrhaphies and posterior colporrhaphies: (1) Tait's flap-splitting perineorrhaphy for complete laceration; (2) Tait's flap-splitting perineorrhaphy for incomplete laceration, modified by Sanger; (3) Cleveland's perineorrhaphy; (4) Hegar's posterior colporrhaphy; (5) Emmet's posterior colporrhaphy.

Describe Tait's perineorrhaphy?

This operation is based on the principles of the healing of an old tear. If the buttocks and labia are widely separated, a white line of cicatrix will be seen extending from side to side *transversely* to the axis of the old wound. The object of the operation is to restore the old rent, and unite it in a vertical axis—*i. e.* at right angles to the present cicatrix.

The patient is prepared as described. An assistant stands on either side, the one on the right holding an irrigator nozzle and allowing a slight stream of 1:10,000 bichloride to trickle over the parts during the operation. A tampon is introduced into the rectum. The middle finger of the left hand is then inserted into the rectum and the buttocks and labia strongly separated by an assistant, so that the cicatrix is put on a stretch. The point of an angular pair of scissors is introduced into the extreme end of the cicatrix on one side, and run through to the other extremity. From each end of this incision another is carried forward to the bases of the labia minora, and again backward for one-third of an inch; the edges of the upper flap *a* are caught with a pair of tissue forceps and dissected upward, the same being done to the lower flap *b* downward, and the wound assumes the shape represented by the dotted lines in Fig. 24. The sutures are now introduced by means of a Peaslee's needle well curved, which is run through from side to side, entered, and brought out just within the margin of the denuded area. This is threaded with

FIG. 24.



silkworm gut and withdrawn. The sutures are then tied and the edges of the skin brought together by intermediary superficial sutures. The rectal and vaginal flaps fold in on each other and, retracting, point to the rectum and vagina respectively. The resulting cicatrix is linear, and leaves scarcely any trace after healing.

What are the advantages of this operation?

(1) No tissue is removed, the recto-vaginal septum is simply split, the flap turned up, sides denuded and united. (2) The sutures are all external. (3) The parts are brought back into their original position.

What additional method of repair may be done in case the laceration extends through the sphincter ani and up the recto-vaginal septum?

After dissecting up the vaginal flap as just described, a V-shaped denudation is made with its apex up the rectum. The ends of each arm of the V lie against the separated ends of the sphincter ani, which can be seen as little retracted dimples on either side of the anal opening. Rectal sutures of silkworm gut are then introduced, beginning at the apex, and are tied in the rectum. The ends of the sutures are left long, and protrude from the anus. A suture of silver wire may be passed around the inverted V.

It is well to introduce the perineal sutures first, in order to avoid stretching the rectum, whose edges have just been brought together. The rectal sutures may be left in for several weeks.

Describe the Sanger-Tait operation.

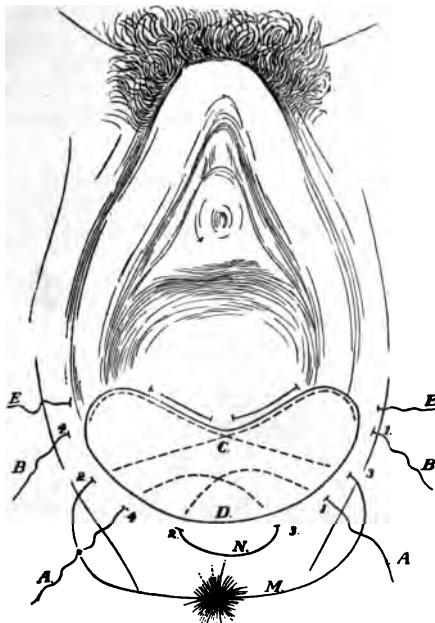
This operation differs only in detail from the one just described. The middle finger alone, or the index and middle fingers, may be introduced into the rectum. The points of a pair of curved scissors are inserted into the recto-vaginal septum between the cicatrix and the margin of the anus, and pushed upward to the crest of the rectocele. The septum is now split before making the horizontal incision. This avoids undue hemorrhage. Sänger also recommends a thin-bladed knife to be used for this splitting instead of scissors. The horizontal incision may now be made, running out to a point on either side vertically below the extremities of the nymphæ, and then carried upward to the bases of the labia minora, or the incision may be curved in the form of a U. The dissection of the flap is now completed. Silver-wire sutures instead of silk-

worm gut are introduced by means of a straight needle threaded with carrying thread. The rectal tampon is removed, and the sutures twisted up and shotted. Intermediary silkworm-gut sutures are required.

Describe Cleveland's operation.

After the usual preparations the patient is anaesthetized and placed in the lithotomy position, as just described for Tait's operation. The field of operation is put on the stretch by two tenacula hooked into the bases of the labia majora on either side and re-

FIG. 25.



Cleveland's Suture for Lacerated Perineum.

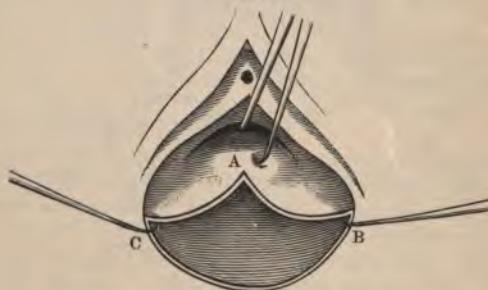
tracted. The crest of the rectocele is caught with a pair of bullet forceps and drawn up by an assistant. A triangular area is now denuded, having for its base the line joining the two lateral tenacula, and for its apex the crest of the rectocele. The denudation may

be made with a knife or pair of scissors. After thoroughly irrigating the parts the sutures are passed in the following manner: A long straight needle, threaded with catgut, size No. 3, is inserted at the point 1 A in the figure, carried to the mid-line, as shown by the dotted lines, and brought out. The needle is then introduced where it came out, and, curving downward, is brought out at 2 A. The catgut is now drawn through, and the needle again introduced at 3 A, carried up to the mid-line crossing the loop, and is brought out at 4 A, finishing the first suture, A. The second suture, B, is passed as indicated by the dotted lines. In the figure the apex of the triangle is shown foreshortened. A third suture, E, is now passed as in the figure. Suture A is first tightened and tied, making a figure of 8 and really two sutures. Next B is brought together, making another figure of 8, and finally E is tied. The advantages of this operation are the rapidity with which it can be performed and its applicability to primary as well as secondary tears.

Describe Hegar's operation.

The patient is prepared in the usual manner and placed in the lithotomy position. Two tenacula are fixed in the lowest part of the labia majora, points B and C, and drawn forcibly to both sides

FIG. 26.



Hegar's Operation, foreshortened.

by assistants. The cervix is caught by its posterior lip with a pair of bullet forceps and drawn downward, forward, and lifted up, as

shown in the figure. A triangular area is now marked out with a knife, having for its base the line B C, which runs across the posterior commissure, and for its apex A, a point just below the cervix. The mucous membrane is denuded from this triangular area, either with a knife dissecting down a flap from the apex A, or with a pair of scissors. The sutures are of silver wire for the vaginal, and silk for the perineal, and are both deep and superficial. The deep sutures are introduced one-third of an inch apart, underlying the whole denuded area. The superficial sutures unite the mucous membrane between each of the deep sutures.

What modifications of this operation may be made with advantage?

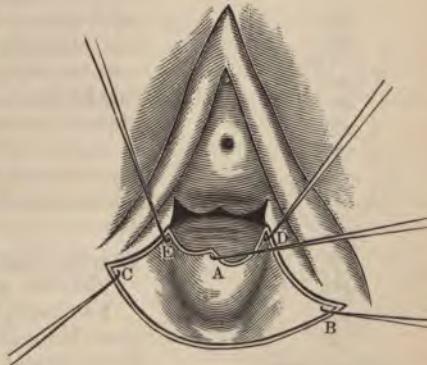
The area of denudation may be brought together with a continuous catgut suture in layers, as used by Martin in his anterior colporraphy, to be described. The apex, A, may be taken at a little above the highest point on the crest of the rectocele and held up with bullet forceps.

Describe Emmet's operation.

This operation is more especially advantageous when the tear takes a Y-shaped form up the sulci, and when there is considerable relaxation.

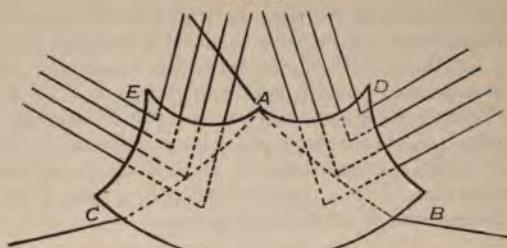
Preparation of the patient is done as usual, and she is placed in the lithotomy position. A point on the crest of the rectocele, A, is caught with a tenaculum. Two other tenacula are introduced into the lowest caruncles of the hymen on either side, C and B. These three points are approximated at the end of the operation. The points D and E are in the sulci on either side of the column of the vagina. Two triangular areas, A D B and A E C,

FIG. 27.



Emmet's Operation.

FIG. 28.



Emmet's Operation : Insertion of Sutures.

are thus formed, and are now denuded as follows: An assistant draws the crest A first strongly to the operator's left side, making the lines A D B nearly straight. The mucous membrane extending along this line is now stripped up with scissors. The same thing is done for the opposite side, drawing the tenaculum at A to the right. Denudation of the whole area shown in the figure is then completed with scissors. The edges of the lateral triangles are united together with sutures carried deep into the sulci and entirely under the denuded area, so as to catch up the ends of the separated fibres of the pelvic fascia. The manner in which the sutures are passed is shown in Fig. 28. There remains now a small area to be united on the perineal surface with silk or wire sutures.

A

FIG. 29.

Urethra

O

B

Martin's Suture.

The usual preliminaries having been gone through with in the preparation of the patient, she is anaesthetized and placed in the lithotomy position. The anterior lip of the cervix is grasped with a pair of bullet forceps and well drawn down. This exposes the anterior wall of the vagina.

Describe Martin's anterior colporrhaphy for cystocele and prolapse.

The anterior lip of the cervix is grasped with a pair of bullet forceps and well drawn down. This exposes the anterior wall of the vagina.

Another pair of bullet forceps is placed just below the urethra and drawn up. The whole surface is put on the stretch by lateral tenacula. Then an incision is made around an ovoid figure which has one point just below the urethra and the other near the cervix. This area, marked out by the line of incision, and which includes to a greater or lesser extent the anterior wall of the vagina, is now denuded with a knife, dissecting down a flap, or with a pair of scissors. Suturing of the area is now performed as follows: A long No. 2 catgut suture is threaded into a medium-sized spear-point needle, and passed through at the apex A and tied. The end of the suture is given to an assistant to hold, and the bullet forceps are removed. The needle is then inserted into the denuded area, passed under the surface, and brought into the denuded area as shown in Fig. 29. In this way, with an over-and-over continuous stitch, the suture is carried to the inferior angle B, then back again to the top in the same manner, until the edges of the mucous membrane are brought near enough together to approximate by additional sutures.

THE URETHRA AND BLADDER.

ANATOMY.

Describe the urethra.

The urethra is a canal $1\frac{1}{2}$ inches in length, extending from the meatus to the neck of the bladder. Its lower three-fourths is imbedded in the anterior vaginal wall; its upper fourth is firmly bound to the vagina by connective tissue. It extends upward and backward parallel to the plane of the pelvic brim.

The mucous membrane is covered with squamous epithelium at its lower part, and transitional epithelium, like the bladder, at its upper position. It contains mucous glands, papillæ, lacunæ, and villous tufts. On cross-section the urethra is seen to be slit-shaped transversely at its vesical end, and stellate below. Just within the meatus, on either side, are the orifices of *Skene's tubes* or ducts. These extend along the floor of the urethra, beneath the mucous membrane, upward for a distance of three-fourths of an inch.

The muscular coat consists of two layers of unstriped fibres, an internal longitudinal and an external circular.

Describe the bladder.

The bladder is a hollow muscular organ situated between the

symphysis in front and the uterus and vagina behind. Its shape when empty is like the letter Y. The upper and lower walls, coming in contact, form the two horizontal arms. The urethra forms the vertical arm. It has opening into it the internal orifice of the urethra and the two ureters: the latter, one on either side, are $1\frac{1}{2}$ inches from each other and from the urethra.

The bladder is divided into a body, neck, and base.

The *body* is "all that portion of the organ lying above an imaginary line drawn from the ureteric openings to the symphysis pubis" (Skene). All below is the base, and includes the *trigone* (that triangular portion between the ureteric openings and the internal orifice of the urethra) and the *bas-fond* (that portion behind the openings of the ureters, which in old subjects may be a deep pouch). The *neck* is the thickened portion surrounding the urethral orifice.

The bladder is composed of three coats, mucous, muscular, and peritoneal. The mucous membrane is thrown into numerous folds, and is lined with several layers of transitional epithelium and a superficial squamous layer. It is loosely attached to the submucous tissue, except at the trigone, and is thicker at the urethral opening, where it has a valve-like function to prevent the escape of urine (Hart and Barbour). The muscular coat is composed of three irregular layers of unstriped fibres, an external and internal longitudinal and a middle circular. At the openings the circular fibres are more developed and have a sphincteric action.

The peritoneal coat covers the fundus and part of the posterior bladder-wall, from which it is reflected on to the anterior surface of the uterus at the level of the isthmus, forming the vesico-uterine ligaments and pouch. The arterial supply is derived from the utero-vesical branches of the anterior division of the internal iliac and from the uterine artery.

The urethra is supplied from the vaginal arteries.

The veins form plexuses outside the muscular coat, and unite with those of the uterus, vagina, nymphæ, and rectum. They empty into the internal iliac vein. The plexus of the urethra communicates with that of the vagina.

The lymphatics accompany the veins, and enter the hypogastric glands near the internal iliac artery. The nerves are derived from the hypogastric plexus of the sympathetic, and from the third and fourth sacral, the latter supplying mainly the base and neck.

Describe the course of the ureters.

At the brim of the pelvis the ureters cross over the iliac vessels just below the division of the common iliacs. Here the left ureter lies behind the sigmoid flexure of the colon, and the right behind the lower end of the ileum. They then run downward, backward, and outward along the pelvic wall until near the ischial spines. Here they bend downward, forward, and inward behind the uterine arteries, passing beneath the bases of the broad ligaments. At the level of the os uteri externum, and three-fifths of an inch distant from the uterus, the uterine arteries cross the ureters. From this point they continue to converge, lying in relation to the anterior vaginal and posterior bladder-walls, and pierce the latter obliquely at a point one-half to three-fourths of an inch in front of and below the cervix. They run for a distance of half an inch in the muscular coat, still converging, so that their internal openings are separated from each other by about one and a half inches.

DISEASES OF THE URETHRA AND BLADDER.**What are the diseases to which the urethra is liable?**

Malformations (hypospadias), urethral caruncle, (see p. 56), and prolapse of the mucous membrane (see p. 57), inflammation (urethritis), urethrocele.

Give the etiology, symptoms, and treatment of urethritis.

It is nearly always due to gonorrhœal infection, but may be simple. The chronic form may be caused by caruncles or chronic cystitis.

Symptoms.—*Dysuria*, muco-purulent discharge.

Treatment.—Tepid irrigations, application of nitrate of silver, iodoform bougies. Skene's tubules may become inflamed and keep up a urethritis until they are slit up and cauterized.

Give the etiology, symptoms, and treatment of the acute and chronic forms of cystitis.

Etiology.—*Acute*: gonorrhœa; exposure to cold; injuries during parturition; peritonitis. *Chronic*: continuance from acute; stone in the bladder; pressure of a tumor or uterus on the bladder; pyelonephritis.

Symptoms.—*Acute*: severe pain over the bladder; chill, fever; painful micturition; high-colored urine. May last a few days to a week, and subside or pass on to the chronic form. *Chronic*: Frequent micturition, more especially at night; vesical tenesmus and

sensation of weight over the bladder; cloudy, scanty urine, containing pus-cells and cells from the bladder. It may debilitate the whole system and cause the patient's health to be undermined. The walls of the bladder may become encrusted with lime and other salts, which give rise to stone in the bladder.

Treatment.—*Acute*: rest in bed; hot poultices over the lower part of the abdomen; demulcent drinks of flaxseed tea and mucilage; opium to check the pain. *Chronic*: The administration of alkaline diluents, such as citric acid, acetate of potassium, uva ursi, lithia-water; unirritating diet. Washing out the bladder with a 1 : 1000 solution of boric acid by means of a double-current catheter and fountain syringe; may be done twice daily if necessary or every other day. The pain is relieved by morphine suppositories. If all these means fail, as a last resource an opening may be made into the bladder through the anterior vaginal wall and the urine allowed to constantly flow away until the condition is relieved.

Describe the operation for buttonholing the bladder (colpocystotomy).

The patient is anaesthetized and placed in the Sims position. A Sims speculum is introduced and a sound passed into the bladder. At the most prominent point in the median line between the neck of the bladder and the urethra an incision is made longitudinally an inch long, care being taken to cut through the bladder mucous membrane as much as the vagina. This enters about half way in the trigone vesicæ. Now with a sharply-curved needle and small catgut the mucous membrane of the bladder is sutured to that of the vagina to prevent healing. Instead of these sutures a sigmoid glass tube, provided with a flange at one end, may be buttoned through this opening and allowed to remain. It is usually necessary to keep the fistula open from three to six months. The bladder in the mean time is frequently irrigated and treated. This operation gives great relief in severe chronic cases. The opening is finally closed as any other fistula.

What are the varieties of fistulæ of the genital tract?

The uterus and vagina may be connected by one or more apertures of variable size and shape with some viscus in immediate proximity, such as the bladder, rectum, peritoneum, etc. They are named according to the parts connected:

Vesico-vaginal fistula (2 and 3, Fig. 30).

Vesico-uterine fistula (1, Fig. 30).
Urethro-vaginal fistula (4, Fig. 30).

FIG. 30.



Location of Various Forms of Fistula: 1, vesico-uterine fistula; 2, vesico-utero-vaginal fistula; 3, vesico-vaginal fistula; 4, urethro-vaginal fistula; 5, recto-vaginal fistula; 6, recto-labial fistula; 7, fistula in ano.

Recto-vaginal fistula.

Enterovaginal fistula.

Peritoneo-vaginal fistula.

Give the etiology, diagnosis, and treatment of fistula.

Etiology.—The majority of the cases of fistula result from pressure of the child's head during parturition, causing a slough; but rarely they have their origin in abscesses, stone in the bladder, pessaries, cancerous and syphilitic ulcerations.

Diagnosis.—Continuous escape of urine from the vagina, causing vaginitis and vulvitis, and the strong urinous odor will indicate urinary fistula. Escaped faeces into the vagina will show a rectal fistula. If the opening is large, it can readily be felt with the finger. If too small to be seen or felt, milk may be injected into

the bladder, which is seen to escape from the fistula, and indicates the site.

Describe Sims's operation for vesico-vaginal and urethro-vaginal fistula.

Treatment.—*Operative.*—The patient having been prepared for operation as in perineal operations, she is anaesthetized and placed in Sims's position. A Sims speculum is introduced and the anterior vaginal wall and fistula are exposed. The edges of the fistula

FIG. 31.



Operation for Vesico-vaginal Fistula.

are now pared, care being taken not to injure the mucous membrane of the bladder. The wound thus formed will be bevelled from the bladder out. The sutures are of fine silver wire threaded on carrying threads, and passed with small curved needles. The needle enters first at the most accessible angle, half an inch from

the edge of the denudation ; it is brought out at the vesical surface, but not involving the mucous membrane, counter-pressure being exerted with a hook or tenaculum. The wire is now drawn through, and the point of the needle reintroduced into the other lip and drawn out half an inch from the edge of the incisions. In this manner a sufficient number of sutures, one-fifth of an inch apart, are introduced and twisted with wire-twisters. A self-retain-

FIG. 32.



Simon's Position for Operation on Vesico-vaginal Fistula.

ing sigmoid catheter is now introduced into the urethra, through which the urine constantly drains until the wound has healed.

The sutures may be removed in eight or nine days.

What modification of this operation may be used with advantage?

Simon's operation. This consists in placing the patient in

Simon's position—*i. e.* an exaggerated lithotomy position, the pelvis elevated. The cervix is grasped and drawn down as for a Martin's anterior colporrhaphy, and the field of operation thus well exposed. The edges are pared as before with scissors or knife, and sutures passed, which in this case are of silk.

What is the treatment for vesico-uterine fistula ?

Split up the anterior lip of the cervix to the fistula, freshen its edges, and pass sutures through the cervix so as to unite the walls of the cervix and lips of the fistula. When the fistular opening is too high up for this operation, the cervix may be closed entirely and the uterine contents allowed to discharge through the bladder.

What is the treatment for recto-vaginal fistula ?

The edges may be pared and brought together as in the operation for vesico-vaginal fistula. If the opening is near the vulva, the tissues between it and the surface may be split and the edges of the fistula dissected out, and the whole united, as in laceration of the perineum, through the sphincter.

THE INTERNAL ORGANS OF GENERATION.

DISEASES OF THE UTERUS.

ANATOMY.

Describe the uterus.

The uterus is a hollow muscular, pear-shaped organ, situated in the centre of the pelvis between the bladder and rectum. It measures 3 inches in length, 2 in breadth at the level of the Fallopian tubes, and 1 inch in thickness. It lies normally, when the bladder and rectum are empty, in a position of anteversion and slight anteflexion. The cervical os points downward and backward, but its position is constantly changing, owing to distension of the bladder and rectum.

It is divided into a body, neck, and fundus. The fundus is that portion above the entrance of the Fallopian tubes; the body is the portion between the fundus and the neck; the neck is the lower half of the uterus, its junction with the body being marked by a slight depression or sulcus called the isthmus. The cavity of the body is triangular in shape, the anterior and posterior walls being in contact. It has a capacity of about twelve drops in nulliparæ.

The cavity of the cervix is spindle-shaped, being constricted at the internal and external os.

The cervix is divided into two portions anatomically—that above the attachment of the vagina (supravaginal), and that below the attachment, protruding into the vagina (vaginal). Schroeder makes a third division, an intermediary portion, below the vaginal junction behind, and above it in front. The vaginal portion varies much in shape and size. At its centre is the external os, which in virgins is slit-shaped, feeling something like the cartilage at the end of the nose. The entire cavity of the uterus measures $2\frac{1}{2}$ inches in length.

The uterine wall consists of three layers: (1) internal mucous membrane; (2) middle muscular; (3) external peritoneal.

The mucous membrane of the body differs from that of the cervix. It is smooth, grayish-pink in color, and directly connected to the muscular layer, without the intervention of a submucous coat. It consists of a single layer of columnar ciliated epithelial cells, the cilia moving upward. These rest on a connective-tissue base, which is rich in lymph-spaces, vessels, and nerves. Imbedded in its substance are a large number of tubular glands, the utricular follicles, which may be straight, tortuous, single, or branching, and have their blind extremities terminating in the muscular coat. They are lined with a single layer of prismatic ciliated cells resting on a membrana propria, and they secrete an alkaline mucus.

The mucous membrane of the cervix is thicker and less red than that of the body. It is thrown into numerous folds called the "arbor vitæ," which consist of an anterior and posterior ridge, from which lateral folds branch off. The surface is covered by a single layer of epithelial cells, which are ciliated on the ridges and non-ciliated in the depressions (De Sinéty).

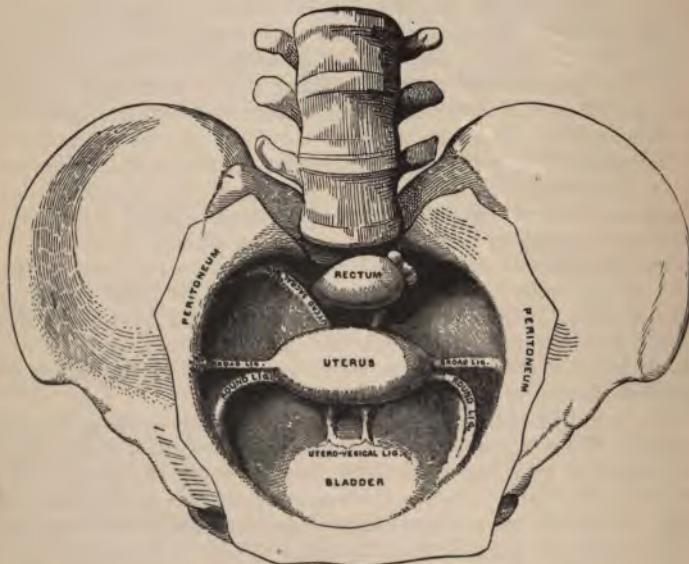
The cervical glands are racemose, and secrete a clear alkaline mucus. When these become pathologically occluded, they produce the retention cysts known as the follicles or ovula of Naboth. The mucous membrane covering the vaginal portion is continuous with that of the vagina, and consists of vascular papillæ covered with many layers of squamous epithelium. There is a sharp line of demarcation between this latter and the columnar ciliated epithelium of the cervical canal.

The vaginal aspect has no glands. The muscular coat consists of three layers of unstriped fibres: (1) External, a thin longitudinal layer called the platysma, most marked on the anterior and

posterior walls, which sends prolongations into the ligaments of the uterus and out to the Fallopian tubes. (2) Middle is the thickest, and consists of longitudinal, transverse, and oblique fibres. (3) Internal, concentric and most marked about the orifices of the Fallopian tubes and internal os.

The peritoneal coat folds over the entire posterior surface of the uterus, except the vaginal portion of the cervix. It covers the anterior surface as low as the isthmus, and is here reflected on to the bladder. Laterally, the two folds come together, forming the broad ligaments, and extend to the wall of the pelvis. Anteriorly it is firmly connected to the uterine wall; posteriorly a layer of areolar tissue is interposed. It is composed of a base of fibrous

FIG. 33.



Position of Parts in Female Pelvis.

and elastic tissues covered by a layer of endothelial cells, and is very rich in lymphatics.

Name and describe the ligaments of the uterus.

Two broad ligaments; two round ligaments; two utero-vesical; two utero-sacral.

The broad ligaments are double folds of peritoneum which run from the sides of the uterus to the pelvic wall. Internally they are continuous with the peritoneum covering the anterior and posterior walls. Externally they are attached to the pelvic wall "along a line situated between the great sacro-sciatic notch and the margin of the obturator foramen, as far down as the level of the ischial spine." Their upper free margin contains the Fallopian tubes. The portion of the margin not occupied by the tube, and extending from it to the pelvic wall, is called the *infundibulo-pelvic* ligament.

The ovary projects through the posterior lamella, and is covered by germinal epithelium. It is attached at its hilum to the anterior lamella.

The round ligaments lie in a fold formed by the anterior lamella.

The portion of broad ligaments extending between the ovary and the Fallopian tube is called the mesosalpinx. In the mesosalpinx below the middle of the tube is the parovarium.

The structures included between the folds of the broad ligament are, from above downward, (1) the Fallopian tube; (2) ovarian artery, nerves, and lymphatics; (3) the pampiniform plexus of veins; (4) the round ligament; (5) the parovarium; (6) the ovarian ligament; (7) the ovary; (8) the uterine artery and venous plexus; (9) connective tissue and lymphatics near the base.

The *round ligaments* spring from the anterior superior portion of the uterus, and extend outward and forward in the anterior folds of the broad ligaments to the internal inguinal rings. They then pass through the inguinal canal and terminate in three fasciculi.

The inner fasciculus blends with the tendons of the internal oblique and transversalis muscles; the middle with the superior column of the external abdominal ring; and the external terminates just above Gimbernat's ligament. They are composed of fibrous tissue, striped and unstriped muscular fibres, and blood-vessels and nerves.

The peritoneal investment of the round ligaments usually ends at the internal ring, but is sometimes prolonged into the labia majora. This, when pervious, is called the "canal of Nuck." The chief interest attaching to the round ligaments is their connection with Alexander's operation.

The *utero-sacral* ligaments are two folds of peritoneum reflected

FIG. 34.

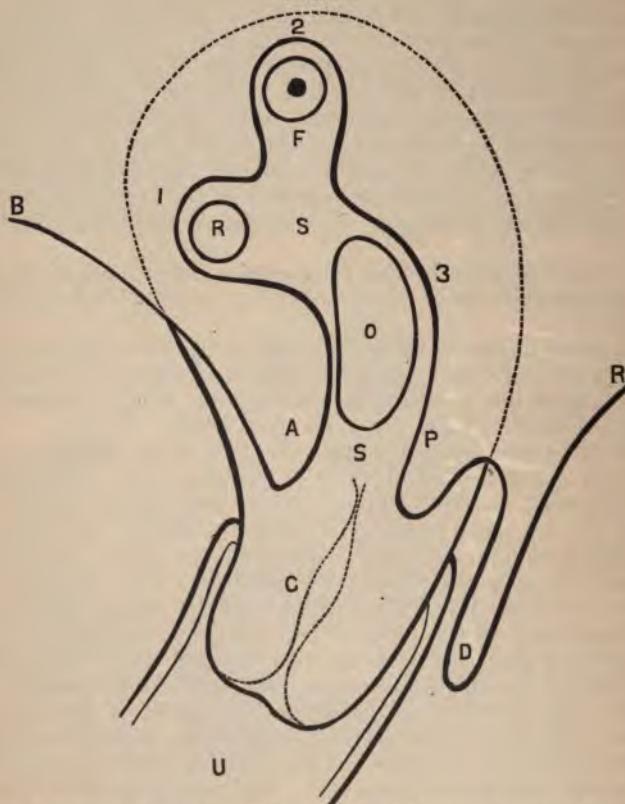


Diagram showing the Three Minor Folds of the Broad Ligament (Ranney): 1, 2, 3, anterior, middle, and posterior folds; *R*, round ligament; *F*, Fallopian tube; *O*, ovary; *V*, vagina; *D*, pouch of Douglas; *A*, anterior layer of broad ligament; *P*, posterior layer; *B*, reflection of peritoneum to bladder; *R*, reflection to rectum; *S*, space containing muscular and connective tissue, enclosing vessels and nerves.

from the sides of the uterus at the level of the isthmus backward, outward, and upward to the second sacral vertebra. They form

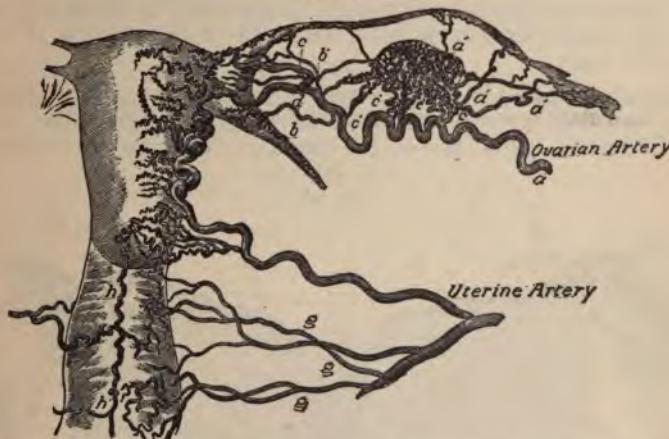
the upper lateral boundaries of the pouch of Douglas, and are of great importance in some malpositions of the uterus.

The utero-vesical ligaments are the folds of peritoneum reflected from the lower portion of the uterus on to the bladder.

What is the vascular supply of the uteri?

Arterial: From the uterine and ovarian arteries. The uterine branch of the internal iliac runs along the base of the broad ligament

FIG. 35.



The Ovarian, Uterine, and Vaginal Arteries (Hyrtl): *a*, ovarian artery; *a'* and *b'*, branches to tube; *b*, branch to round ligament; *c'*, branches to ovary; *g*, vaginal artery; *h*, azygous artery of vagina.

to a point below the level of the os externum near the cervix; then it curves upward along the uterine wall and anastomoses with the ovarian. Its branches in the substance of the uterus are very tortuous, and are known as the "curling arteries." At the junction of the body with the cervix a large branch is given off which unites with its fellow of the opposite side to form the "circular artery."

The veins form a plexus around the uterus beneath the peritoneum, and communicate with the vaginal and vesical plexuses below and the pampiniform above. They empty into the internal iliac vein.

The *lymphatics* are very numerous, and form a dense network in the broad ligaments, terminating in the lumbar and hypogastric glands.

The *nerve-supply* is derived from the hypogastric plexus of the sympathetic, and a few fibres from the third and fourth sacral nerves.

MALFORMATIONS AND DISEASES OF THE UTERUS.

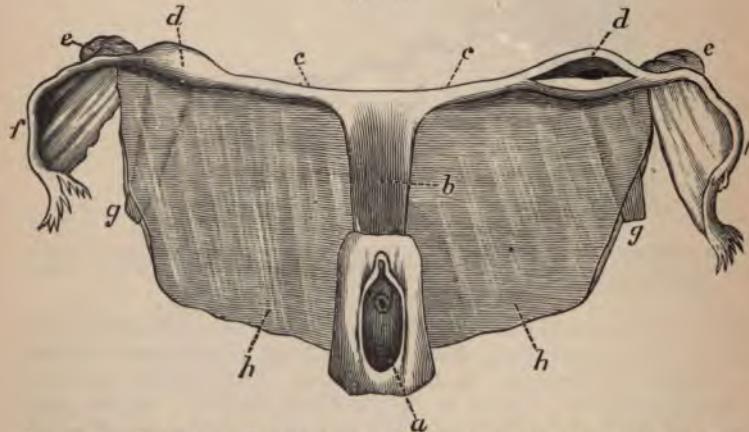
Malformations.

It is of the greatest importance, in the study of malformations of the uterus, to bear in mind the mode of development of the genital tract.

Give a brief description of the development of the female genitals, and state how malformations of the uterus are produced.

Before the end of the second month of foetal life the Wölffian

FIG. 36.



Uterus Bipartitus of a servant sixty years of age: *a*, vagina, about one inch deep, and ending at the anterior wall of the rectum, above the internal sphincter; *b*, connective tissue interspersed with muscular fibres, simulating the shape of a uterus; *c, c*, fleshy strings representing the horns of the uterus; *d, d*, swellings of the size of a bean, one cut open and showing a cavity of the size of a lentil and lined with mucous membrane; *e, e*, rudimentary ovaries; *f, f*, Fallopian tubes; *g, g*, round ligaments; *h, h*, broad ligaments. (From Kussmaul, after Mayer.)

bodies appear, one on either side of the vertebral column. Each

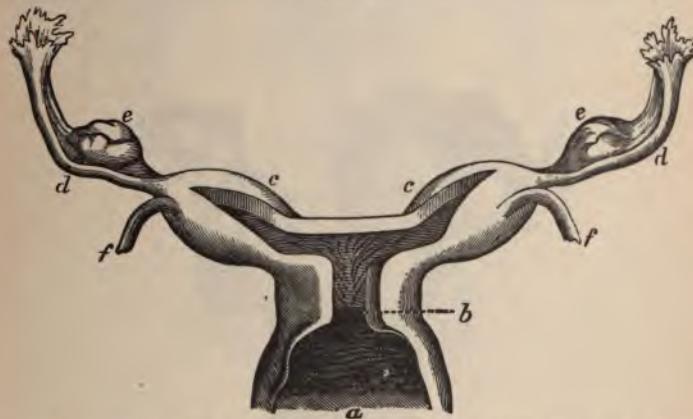
consists of a large number of convoluted tubules closed at one end, and opening by the other into a common duct. In a fissure at the inner border of these bodies lies the genital gland on each side, which subsequently develops into the ovary. The ducts of Müller spring from the inner sides of the upper ends of the Wölffian bodies, one on each side. These approach each other, and coalesce to form the uterus and vagina, the septum being absorbed. The upper portion of the ducts forms the Fallopian tubes.

Malformations are produced when there is an arrest of development in one or both of the ducts of Müller; when they fail to unite; when the septum between them is not absorbed.

What are the varieties of malformations?

(1) Absence of, or a rudimentary, uterus, occurring when there is an arrest of development of the ducts of Müller. This condition is

FIG. 37.



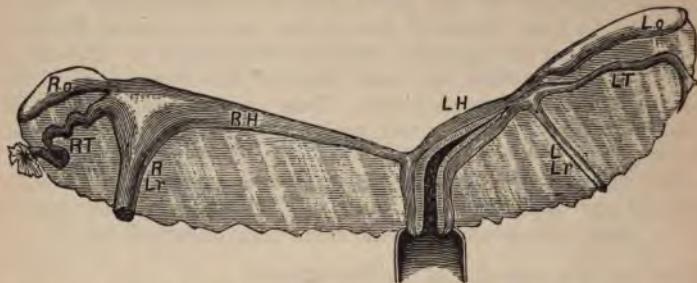
Uterus Bicornis Unicollis of a Virgin: *a*, vagina; *b*, single neck; *c*, *c*, horns; *d*, *d*, tubes; *e*, *e*, ovaries; *f*, *f*, round ligaments. (From Kussmaul.)

usually accompanied by absence of the entire generative tract.

(2) Unicorn uterus, due to an arrest in the development of one duct of Müller.

(3) Uterus bicornis, where the union of the Müllerian ducts is imperfect, resulting in two horns.

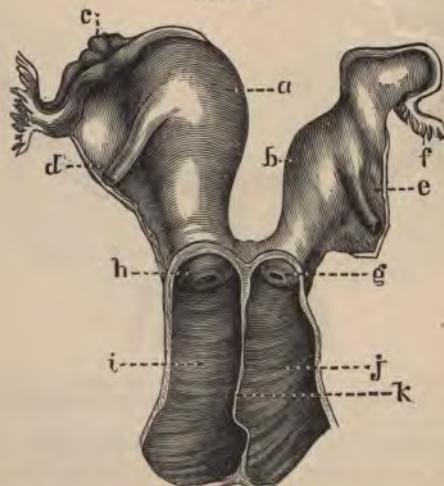
FIG. 38.



Uterus Unicornis: *LH*, left horn; *LT*, left tube; *Lo*, left ovary; *LL*, left round ligament; *RH*, right horn; *RT*, right tube; *Ro*, right ovary; *RL*, right round ligament. (From Schroeder.)

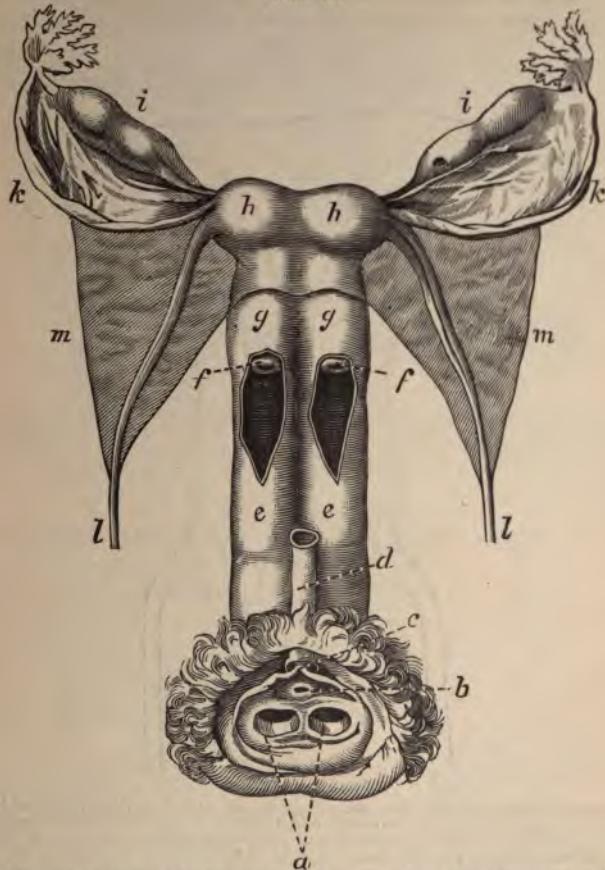
(4) Double uterus (very rare), in which the two horns have de-

FIG. 39.



Uterus Didelphys: *a*, right cavity; *b*, left cavity; *c*, right ovary; *d*, right round ligament; *e*, left round ligament; *f*, left tube; *g*, left vaginal portion; *h*, right vaginal portion; *i*, right vagina; *j*, left vagina; *k*, partition between the two vaginas. (From *De Saincy*, after Ollivier.)

FIG. 40.



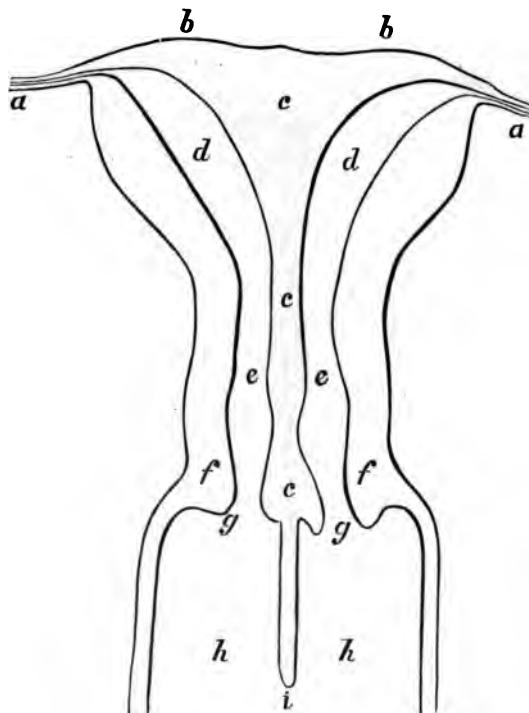
Uterus Bicornis Duplex: *a*, double entrance to vagina; *b*, meatus urinarius; *c*, clitoris; *d*, urethra; *e, e*, double vagina; *f, f*, external orifices of uterus; *g, g*, double cervix; *h*, bodies and horns of uterus; *i, i*, ovaries; *k, k*, tubes; *l, l*, round ligaments; *m, m*, broad ligaments. (From Kussmaul, after Eisenmann.)

veloped separately, not coalescing. This is usually associated with a double vagina.

(5) Divided uterus, in which the septum has not been absorbed.

(6) Fœtal or infantile uterus, in which the uterus remains small, and there is a disproportionately large neck. At birth the

FIG. 41.

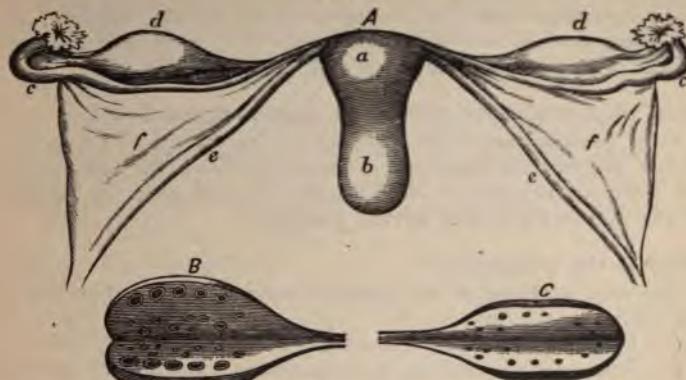


Uterus Septus Duplex (natural size), completely double uterus and incompletely double vagina of a girl twenty-two years old: *a*, *a*, tubes; *b*, *b*, fundus of the double uterus; *c*, *c*, *c*, partition of uterus; *d*, *d*, cavities of the uterine bodies; *e*, *e*, internal orifices; *f*, *f*, external walls of the two necks; *g*, *g*, external orifices; *h*, *h*, vaginal canals; *i*, partition which divided the upper third of the vagina into two halves. (From Kussmaul.)

neck is normally small, larger than the body, and if arrest of development takes place at this stage the above condition results.

(7) Congenital atrophy. This condition results from a lack of development after the uterus has reached its normal proportions, remaining small.

FIG. 42.



Infantile Uterus of a girl twenty-one years old: *A*, uterus and appendages diminished: *a*, body; *b*, neck; *c*, *c*, tubes; *d*, *d*, ovaries; *e*, *e*, round ligaments; *f*, *f*, broad ligaments; *B*, right ovary cut open longitudinally, showing large Graafian follicles; *C*, left ovary with smaller follicles. (From Kussmaul.)

HYPERTROPHY.

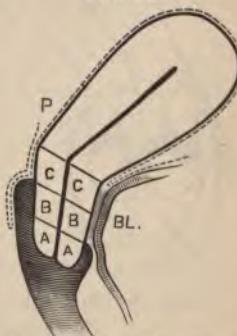
In what sites may hypertrophy of the cervix occur?

In the supravaginal portion, the median portion, or the infravaginal portion of the cervix. Hypertrophy of the infravaginal portion alone requires extended description. It is seen in its purest type in unmarried women, and is spoken of as the penis-like hypertrophy of the cervix.

What is its pathology?

The histological elements are uniformly increased (especially in their length). The mucous membrane covers a more extensive surface, but is not diseased. As the infravaginal portion increases in length, it tends to become conical. The external os is usually small and at the apex. The cervix is tense and firm; it presents none of the signs of inflammation. It may protrude from the vulva, looking like an erect penis.

FIG. 43.



Classification of the Cervix into three parts: *P*, peritoneum; *BL*, bladder; *A*, portio vaginalis; *B*, portio media; *C*, portio supravaginalis. (After Schroeder.)

What are its symptoms ?

(1) Dysmenorrhœa ; (2) disturbance of coitus ; sterility ; (3) symptoms due to mechanical irritation if it protrudes from the vulva. There is no great degree of dragging pain.

From what conditions must it be diagnosed, and how ?

From prolapse and from inversion of the uterus. In hypertrophy of the cervix a bimanual examination shows the existence of the body of the uterus and of the anterior and posterior fornices of the vagina, all in their normal positions.

What is the treatment ?

The only *treatment* of any effect is surgical—viz. amputation of the cervix—

- (a) By the galvano-cautery, a poor method ;
- (b) Schroeder's operation, a wedge-shaped excision of anterior and posterior lips, followed by suture of the vaginal and uterine mucous membrane.

FIG. 44.



Schroeder's Operation.

What is its prognosis ?

Spontaneous cure does not take place. The *prognosis* after operation is very good indeed. The removal of even a small portion often causes involution of the rest.

ATROPHY.

What are the two varieties of acquired atrophy of the uterus ?

- (1) Senile atrophy ; (2) premature atrophy.

Describe senile atrophy of the uterus.

The uterine walls are thin and atrophic ; the mucous membrane thin and without glands ; the os internum is often constricted, and sometimes there is retention of secretions. The vaginal portion of the cervix is obliterated, and the os externum is felt as a dimple. The vagina is short and narrow ; its walls are thin and membranous, and there is no fat in the surrounding tissues. The labia majora lie far apart.

The nymphæ are almost obliterated. The clitoris is small, and has neither prepuce nor frænulum. The condition is normal after about the sixtieth year, and gives rise to no *symptoms* and requires no *treatment*.

What are the causes of premature atrophy of the uterus?

It occurs usually between the ages of twenty and forty-five years. (a) Puerperal fever, especially if the ovaries or the peritoneum is involved; (b) tuberculosis; (c) perhaps sometimes removal of ovaries.

What are the symptoms?

The involution is abnormal, leaving the uterus soft and flabby, and of less than the normal size. (a) Anæmia and debility; (b) amenorrhœa after confinement, even after stopping lactation: in fact, most of these patients do not nurse their children; (c) change in general appearance (prematurely old, distressed, and sick); (d) hot and cold flashes, and rushing of blood to the head or face; (e) disturbed vision; (f) cold hands and feet; (g) hysterical fits of crying, etc.

Upon what is the diagnosis based?

Absence of menstruation; uterus small, thin, and flabby; with the probe in the uterine cavity the uterus feels thin, and not firm. The cavity measures about two inches, but may measure two and a half inches.

What is the treatment?

(a) General: Change of climate, exercise, diet, attention to functions of the skin and digestive tracts.

(b) Local: Irritation; occasional use of the sound; occasional use of tents (cautiously); the galvanic pessary.

What is the prognosis?

The disease does not threaten life. A return to the normal condition is exceptional, but the unpleasant symptoms may often be ameliorated.

DISPLACEMENTS OF THE UTERUS.

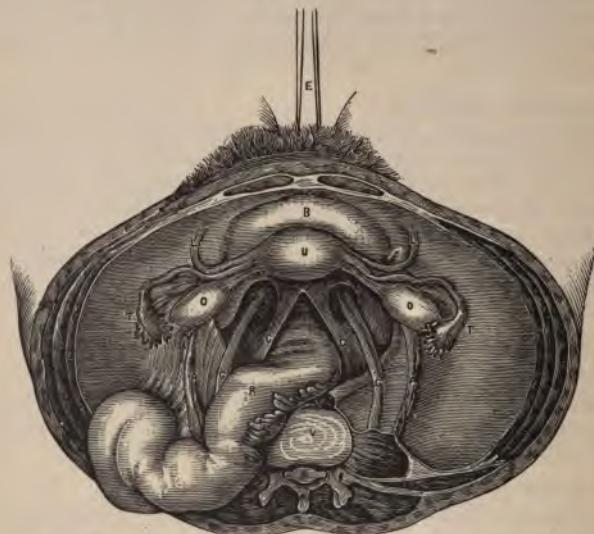
Describe the normal position of the uterus in the living woman, and the factors which influence it.

"The normal position of the uterus is determined by its connection with the tissues adjacent to it, by its fixation in the vagina.

and pelvic fascia, and by its attachment to the bladder and to the peritoneum" (Shultz).

The muscular fibres in the round ligaments and in the folds of Douglas are important factors, the former drawing the fundus

FIG. 45.



Horizontal Section of Body, showing uterus and round ligaments (Savage): *B*, bladder; *U*, uterus; *C C*, utero-sacral ligaments; *L L*, round ligaments; *O O*, ovaries; *T T*, tubes; *R*, rectum.

forward, and the latter drawing the cervix backward. Intra-abdominal pressure and its own weight also influence the position of the uterus, the former much more than the latter during life.

The uterus is capable of considerable mobility, being pushed backward by a distended bladder (Fig. 47), forward by a distended rectum (Fig. 48), and upward when both are full (Fig. 49). Bimanual examination and the uterine sound are the methods employed in determining the position of the uterus.

"When a woman is standing upright, and her rectum and bladder are empty, her uterus is nearly horizontal, is more or less

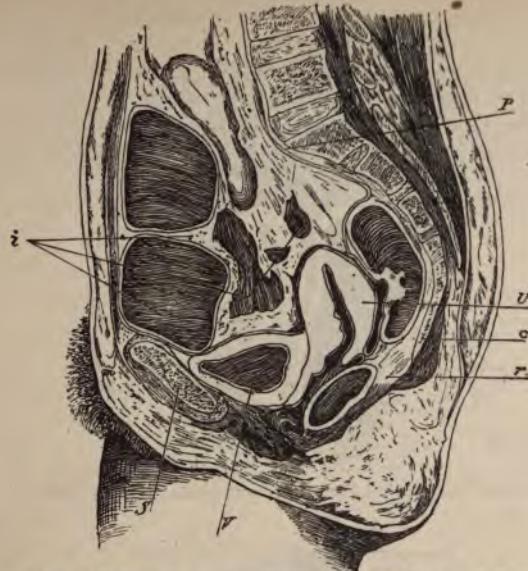


FIG. 46.—Position of the Uterus in a Frozen Section when the Rectum and Bladder are Empty (Martin). Differing from the representations usually given.

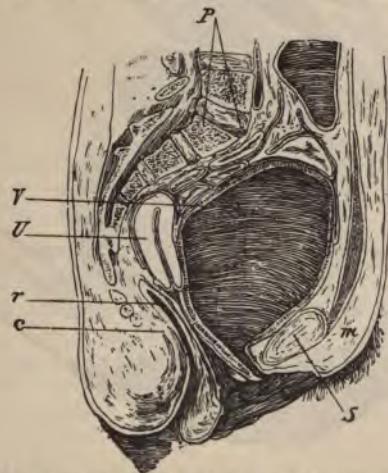


FIG. 47.—Uterus pushed Backward by a Distended Bladder (Martin).

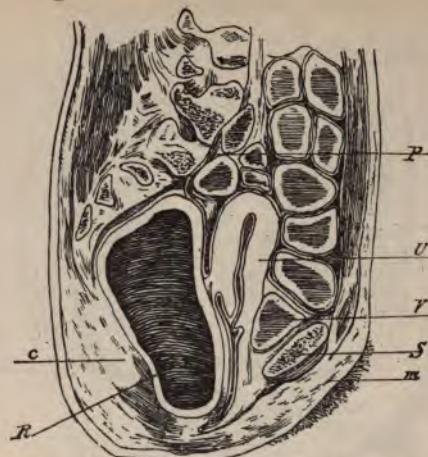


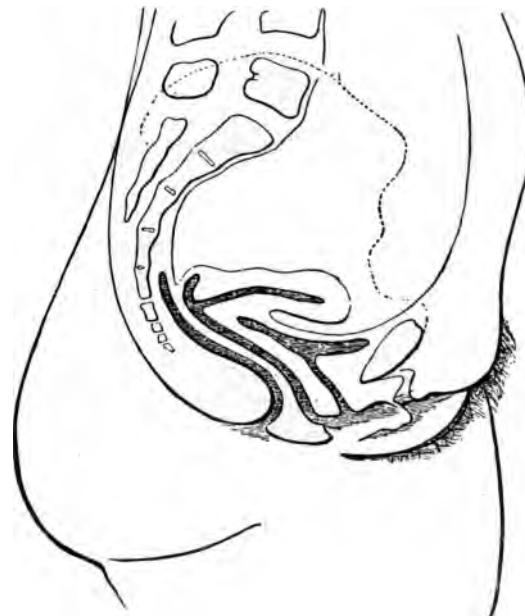
FIG. 48.—Uterus pushed Forward by a Distended Rectum (Martin).



FIG. 49.—Position of Uterus in a Frozen Section when both the Bladder and Rectum are Distended (Martin).

anteflexed, and is turned a little to the right" (Shultz). (See Fig. 50.) In the dorso-horizontal position of the woman the fundus uteri lies behind and a little above the symphysis, the os uteri faces the rectum, and the cervix makes nearly a right angle with the vagina. When the bladder is empty its superior and inferior walls come in contact, and the fundus uteri lies forward on these,

FIG. 50.



Normal Position of the Uterus during life when the bladder and rectum are empty.

as shown in Fig. 50. This is determined by the use of the sound in the bladder and bimanual examination.

The uterus is normally much more flexible than is usually supposed, being easily bent at the junction of the body with cervix (*i. e.*, the os internum) by the fingers during bimanual examination. After death this flexibility ceases.

Define what is understood by pathological displacements of the uterus, and state the varieties.

Any variation from the normal position of the uterus which is permanent constitutes a displacement. Abnormal mobility or fixation is also looked upon as a displacement, which is classified according to the direction from the normal.

The varieties are—elevation, descent, prolapse, anteposition, retroposition, latero-position, anteversion, retroversion, anteflexion, retroflexion, latero-flexion.

The uterus may be twisted about its long axis, constituting torsion.

Combinations may exist of retroversion with anteflexion, anteversion with retroflexion, etc.

What is the frequency of uterine displacements?

They are among the most common affections of the female generative organs.

What is meant by flexions, and what by versions of the uterus?

Flexion of the uterus signifies a bending of the uterine body at its junction with the cervix (the internal os), and is in the majority of cases only an expression of the normal flexibility of the uterus. By version is meant an inclination of the whole uterus without flexion, the canal being straight, and it is due to rigidity and loss of the normal flexibility. Therefore versions, either retro- or ante-, are more serious than flexions.

Flexions are always associated with more or less version, but version presupposes the absence of flexion.

ANTEVERSION.

What are the etiology and pathology?

Pathological anteversion is that position of the uterus in which the fundus lies forward on the bladder, with its axis straightened out and the cervix pointing backward to the hollow of the sacrum, the whole uterus less than normally movable and rigid. This is due to inflammatory thickening and infiltration, destroying the normal flexibility of the uterus. It is always associated with perior parametritis and metritis, the former forcing the cervix backward and above and the fundus below, and the metritis causing a general enlargement of the uterus and thickening, chiefly at the *junction of the body with the cervix*.

The *causes* are those which produce para- and perimetritis and cellulitis: subinvolution, lacerations of the cervix, sepsis, and other

FIG. 51.



Normal Position of the Uterus in a Parous Woman (Schultze).

acute and chronic inflammations affecting the peritoneum and uterus.

What are the symptoms?

The *symptoms* are those of the accompanying perimetritis and metritis; also frequent micturition, due to pressure of the fundus on the bladder and thus preventive of its proper expansion.

The movements of the heavy tender uterus due to varying fulness of the bladder and the postural changes of the back cause discomfort and metrorrhagia.

What is the diagnosis?

This is made by bimanual examination. The fundus lies forward on the anterior vaginal wall, the cervix points backward and upward into the hollow of the sacrum, and there is complete absence of flexion.

What is the treatment?

This is directed to the cure of the metritis and pelvic peritonitis by hot douches, iodine to the cervix and fornices, and boroglycerite tampons. After the inflammatory conditions have been removed, a soft rubber ring or a Graily-Hewitt's cradle pessary may be adjusted with advantage. Ergot and hydrastis may be administered for the metrorrhagia. Scarification of the cervix is useful. Schröder's amputation of the cervix by curing the metritis relieves all the symptoms.

ANTEFLEXIONS.**What are the etiology and pathology?**

Anteflexion is the inclination forward of the body of the uterus alone, the bend nearly always taking place at the level of the internal os. It is an exaggeration of the normal condition, and only becomes pathological when there is *rigidity* at the point of flexion.

What is the etiology?

Anteflexion may be *congenital* (puerile, in which there is the elongated cervix) or *acquired*. The latter is due to causes situated within or without the walls of the uterus. Causes within are—metritis, fixing the point of flexion; irregular involution, during which the posterior wall remains large; tumors of the posterior wall with broad bases. Causes from without are the most common: parametritis and perimetritis, followed by contractions in the folds of Douglas and utero-sacral ligaments, drawing the middle segment of the uterus upward and backward. The posterior parametritis may be of puerperal origin or due to laceration of the cervix, cervical catarrh, etc.

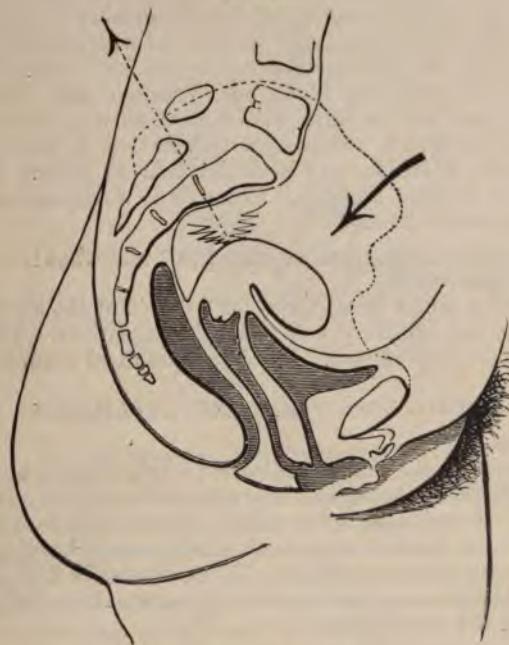
What are the symptoms?

They are chiefly those of the causes, especially posterior parametritis. The two most important symptoms are dysmenorrhœa and sterility. Other symptoms are frequent and painful micturition, pain on defecation, leucorrhœa, backache.

What is the diagnosis?

The *diagnosis* consists in the establishment of the stability of the flexion. This can be determined by bimanual and recto-abdominal examination and the use of the sound. Note whether the flex-

FIG. 52.



Anteflexion of Uterus. *

ion remains with a distended bladder; note a thickening contraction and tenderness in the folds of Douglas and utero-sacral ligaments. On digital examination the cervix is found lying in the axis of the vagina, rather high, os pointing forward, and, as the finger is passed along the anterior wall, a sulcus is felt at the junction of the body with the cervix. The fundus is found lying forward.

What is the treatment?

Except for those cases in which the rigidity is due to tumors of the posterior wall and to metritis the *treatment* consists in the removal of the existing posterior parametritis. This is done by the use of boroglycerite and depleting tampons, local applications of iodine and iodide-of-potash solution in glycerin, hot vaginal douches, and sitz-baths. Keep the bowels well regulated. For existing endometritis the cervical canal to above the internal os may be dilated, and the endometrium thoroughly washed out with carbolic solution, 1:100. After all inflammatory conditions have been removed, the uterine cavity may be dilated with Peaslee's steel dilators and Goodell's dilator, and an intra-uterine stem, such as Outerbridge's wire stem, introduced. This stem may be left in place for one month, or the dilatation may be maintained by passing the steel dilators once or twice a month. Chlorosis is a frequent complication, and must be treated.

For what might anteflexions be mistaken? and what is the differential diagnosis?

Anteflexions might be mistaken for a fibroid of the anterior wall and anterior inflammatory and cellulitic exudations. The sound passed into the uterine cavity will determine these conditions.

RETROVERSION AND RETROFLEXION.**Define these.**

Retroversion is the stable inclination of the fundus uteri backward, the shape of the organ being extended or slightly anteflexed (Shultz). Retroflexion is the stable or permanent backward dislocation of the fundus uteri, with simultaneous bending of the uterus over its posterior surface. There is usually first a version, then a flexion, due to a continuance of the intra-abdominal pressure acting upon the anterior aspect.

What are the etiology and anatomy?

The *cause* may be acute or chronic. *Acute* (rare): falls, blows on the abdomen, lifting heavy weights, all of these accompanied by the condition of a full bladder.

Chronic: arrest of development, resulting in a long cervix and short anterior vaginal wall. The dilatation of the bladder pushes the uterus back into retroversion. If metritis is present, it becomes rigid and stable. Senile shortening of the anterior vaginal wall also produces this condition.

Retroversions and flexions are more common in married than in unmarried women, due to the effect of parturition. The dorsal position with an habitually full bladder, relaxation of the ligaments, and getting out of bed too early after labor are also causes.

Relaxation of the utero-sacral ligaments alone, caused by para-

FIG. 53.



Retroversion and Retroflexion of the Uterus.

metritis posterior or combined with anterior fixation of the cervix, due to shortening of the utero-vesical ligaments, will result in posterior displacements, and is their most common cause.

These conditions being present, the distended bladder pushes the uterus back, and the intra-abdominal pressure comes to act directly on the anterior wall, completing the displacement.

Flexions result from differences in the nutrition of the anterior and posterior uterine walls.

What are the complications?

There is usually more or less catarrhal endometritis present. The uterus is enlarged and rigid, due to metritis. The ovaries become displaced, enlarged, and tender. Relaxation of the anterior vaginal wall, with prolapse, is a common complication. Peritonitic adhesions, forming between the fundus uteri and the rectum, are complications.

What are the symptoms of retroversions and flexions?

Menorrhagia and metrorrhagia; sterility; painful micturition and defecation; tender ovaries, due to traction and displacements and causing iliac pain; backache; leucorrhœa; dysmenorrhœa; tendency to abortion; reflex neuroses.

What is the diagnosis?

This is determined by digital and bimanual examination. The cervix will be found pointing forward nearer the vulva, and in the anterior part of the pelvis. The finger being passed backward along the posterior wall of the cervix into the posterior fornix, the fundus uteri will be felt. In retroversions the body is directly continuous with the cervix. In retroflexions a sulcus or kink will be found in the posterior wall, and it is more difficult to recognize the connection between the body and cervix. This last can best be accomplished by bimanual examination. The body moves with the cervix, and the sound passes backward.

For what might you mistake retroversions and flexions?

Tumors and exudation masses behind the uterus. Bimanual examination will always show the presence of the uterine body in front of a tumor. The uterine sound may be employed, except during the acute stage of inflammation. Drawing down the uterus with the volsellum will often show the relation of the fundus to the tumor.

What is the treatment?

Indications: (1) Cure the exciting complications; (2) replace the uterus; (3) retain in position. Retroversion due to arrest of development can usually be easily replaced, but it is difficult to keep in position. Pregnancy has a favorable influence upon this.

When due to senile involution, as a rule, there are no symptoms, and therefore no treatment is required. When due to anterior fixation of the cervix, promote absorption of the results of parametritis. When due to high posterior fixation of the cervix, treat the posterior parametritis. When due to shrinking of the posterior wall or elongation of the anterior wall, remove tumors or inflammatory condition and place an intra-uterine stem. When due to relaxations of the utero-sacral ligaments, the treatment consists in replacing the uterus and keeping it in position by a suitable pessary.

What methods are employed to replace a retroverted uterus?

(1) Bimanual vagino-abdominal and recto-abdominal manipulation; (2) sound and uterine repositor; (3) genu-pectoral position and manipulation; (4) Sims's position.

Describe the bimanual method.

This, as described by Shultze, is said by him to be the "only proper method." The patient being placed in the dorso-horizontal position, the index and middle fingers of the left hand are introduced into the posterior fornix of the vagina, or, if this does not reach high enough, they may be introduced into the rectum. The body of the uterus is now pushed upward on one side of the sacral promontory to the brim of the pelvis. The right hand, on the abdomen, now grasps the fundus and draws it forward, while the internal fingers are placed in front of the cervix and push it backward and upward, in this way completing the reposition.

Describe reposition by the uterine sound.

This may be employed when the uterus is too sensitive to be pushed upward by the fingers, but is always more or less unsafe. The sound is first enveloped in cotton and dipped in a carbolic solution. It is then introduced, concavity backward, and the handle made to describe a circle from behind forward; then slowly depressed, throwing the uterus forward.

Describe the genu-pectoral position.

This method is applicable when a gravid uterus becomes wedged below the sacral promontory. The patient being placed in the genu-pectoral position, the cervix is grasped with a pair of volsella or bullet forceps and drawn down; at the same time the fundus is pushed forward by the finger in the rectum.

What is the treatment by Sims's position?

The patient is placed in Sims's position and the fingers of the right hand introduced into the posterior fornix. The fundus uteri is first raised to the brim of the pelvis; then during expiration the fingers are shifted in front of the cervix, and this is pushed strongly backward, completing the reposition.

Describe the method of treatment in cases where the fundus is fixed posteriorly by adhesions.

Gentle massage of the adhesions through the posterior fornix

with one or two fingers for five or ten minutes at a time, stretching the adhesions at the same time by gently pushing up the fundus; hot douches and sitz-baths; boroglycerite or iodide-of-potash tampons, pushed well into the posterior fornix and allowed to remain twelve to twenty-four hours. Forceful breaking up of adhesions under anaesthesia by bimanual manipulations is sometimes resorted to, but is dangerous.

How is the uterus retained in position after reposition?

By pessaries and operations.

PESSARIES.

What are the best varieties?

(1) Figure-of-eight, made of copper wire covered with soft rubber, or, after being fitted, copied in hard rubber. (2) Sledge-shaped, made of same materials. (3) Hodges' and its various modifications by Emmet, Thomas, and Albert Smith.

What is the main object to be attained by a pessary?

The retention of the cervix backward, not the pushing of the fundus forward.

Describe the figure-of-eight pessary.

A ring of the materials named, and of suitable size for the case, is first drawn out into an oval shape, and then twisted on itself, forming two loops, the upper one small and curved upward, the lower one larger, somewhat pointed at its extremity, and curved down.

Describe the sledge pessary.

The same ring is first drawn into an oval form, and then one end, which is to be the lower, is bent forward on itself and flattened. Hodges' pessary and its modifications are made of hard rubber.

The Albert Smith pessary is narrow at the lower end and curved down, broader at the upper end and curves up behind the cervix.

FIG. 54.



Hodges' Closed Lever Pessary.

What is the method of introducing a pessary?

This may be done in the Sims or dorso-horizontal position. The pessary is grasped firmly between the thumb and forefinger of the right hand by its lower extremity. The labia are separated by the left hand from below. Introduce the pessary first in a vertical or slightly oblique axis, pressing strongly down on the perineum, thereby gaining room. As soon as the ostium vaginalis is passed halfway, turn the pessary into a horizontal position and continue the introduction by the index finger of the right or left hand placed against the internal loop or bar, and carry this along the posterior wall up behind the cervix, as shown in the figure.

In the figure-of-eight pessary the cervix must be fitted into the smaller loop.

The sledge pessary is particularly adaptable to relaxed conditions of the pelvic floor.

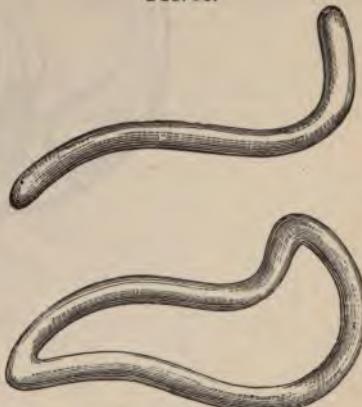
What are the contraindications to the use of pessaries?

They should never be used until all pelvic inflammation has been removed. They should rarely be used unless the uterus can be thoroughly replaced.

How long may a pessary remain in situ? and what precautions are to be observed?

A pessary should be removed once a month, cleaned, and replaced. After the introduction of a pessary for the first time the patient must be questioned as to pain or discomfort in walking, sitting down, crossing the legs, etc. She should be told to remove it if it causes pain. She should be seen every day for a few days, to see that the uterus remains in position.

FIG. 55.



Albert H. Smith's Pessary.



FIG. 56.—Introduction of Pessary.



FIG. 57.—Introduction of Pessary.

What operative procedures may be resorted to for retaining a replaced retroverted or retroflexed uterus?

(1) Shortening the round ligaments (Alexander's operation), now rarely resorted to; (2) ventro-fixation or hysterorrhaphy; (3) Shücking's operation.

Describe Alexander's operation.

The mons veneris is shaved and prepared antiseptically. An incision is made, $1\frac{1}{2}$ to 3 inches in length, parallel to Poupart's

FIG. 58.



The Pessary in Position.

ligament, in an outward direction from the pubic spine. This incision is made down to the intercolumnar fascia covering the ring, which is indicated by the oblique fibres crossing the ring and by the protrusion of fat at the lower end. The protruding tissue, including the round ligament, is now lifted by an aneurism needle,

grasped by the fingers, pulled out, and sutured to the pillars of the ring. The same thing is done for the other side. The wound is now closed with catgut, silk, or silver wire, and the usual anti-septic dressings applied. The patient is kept in bed for two or three weeks, and a pessary must be worn for some months.

The operation is rapidly going into disuse, on account of its being unsuccessful in permanently holding the uterus forward, and owing to its establishing one pathological condition, anteversion with fixation, for another. It is also inapplicable unless the uterus is replaceable, and does not influence the relaxation of the utero-sacral ligaments, which is the main cause of the displacement.

Describe the operation of ventro-fixation.

This is accomplished by laparotomy, and is indicated, rarely, when all other means have failed and there is considerable posterior fixation. An incision is made in the median line of the abdomen, as for any abdominal section. The adhesions of the uterus are broken up, and the fundus brought forward and sutured to the anterior abdominal wall with chromicized catgut or silk sutures. The abdominal incision is closed in the usual manner. A pessary must be worn here also for some time.

Describe Shucking's operation briefly.

The uterus having been replaced and held anteriorly and to one side, a sound is passed into the bladder and pushed strongly to the other side to avoid injury to the bladder-wall. A curved canula, containing a concealed needle threaded with carrying thread, is now introduced to the fundus of the uterus. The needle is pushed forward by its handle through the canula, piercing the uterine wall, curving downward, and appearing through the anterior vaginal wall near the cervix. The carrying thread is then grasped and the needle and canula withdrawn. A loop of floss silk is passed through the loop of carrying thread and drawn back and out at the external os. The two ends are now tied together, producing a pathological anteflexion.

DESCENT AND PROLAPSE OF THE UTERUS.

Define these.

The uterus is said to descend when it comes to lie at a lower plane in the pelvis than normal, and a digital examination encounters the vaginal portion too soon. Prolapse is said to take place

when the vaginal portion emerges from the vulva (Shultz). The latter may be *incomplete* when the cervix just appears at the vulva, or *complete*, in which the uterus lies entirely outside the body between the thighs. It is always accompanied by more or less complete inversion of the vagina and prolapse of the posterior bladder-wall.

Other displacements may coexist with descent and prolapse. The uterus is usually retroverted and flexed.

What are the etiology and anatomy?

The uterus is maintained in position by the support of the vagina, the bladder, its own ligaments, and the pelvic floor.

The *predisposing causes* of prolapse are childbirth, causing a relaxed condition of the vagina, and of the peritoneal and ligamentary attachments of the uterus; retroversions, due to an habitually distended bladder. In these cases the intra-abdominal pressure, acting through the intestines, is brought to bear upon the uterus unsupported by the bladder, and descent and prolapse result; relaxation of the pelvic floor, such as is produced by laceration of the perineum and in old age; and laborious occupation and increased weight of the uterus.

The *exciting causes* may be *acute*, blows, falls, severe exertion, heavy lifting, etc., or *chronic*, which is much more common. The chronic causes are practically the same as the above predisposing causes, resulting in gradual relaxation of the uterine supports.

Hypertrophies of the cervix, either of the infravaginal, supravaginal, or intermediary portion, and usually accompanied by prolapse, abdominal tumors, and ascites, are caused by pressure of the uterus downward.

What are the symptoms and diagnosis?

The *symptoms* of descent are those of retroversion and any coexisting complications. The symptoms of the acute form are violent pain, vomiting, vertigo, fainting, followed by retention of urine, and signs of peritonitis; of the chronic form are, first, a feeling of weight and tension in the hypogastric, iliac, and sacral regions, followed by frequent and difficult micturition; in complete prolapse discomfort from the protrusion and excoriation of the parts.

What is the diagnosis?

Inspection when the prolapse is partial shows the prolapsed anterior and posterior vaginal wall, the protruding cervix and os in the

centre. Ascertain by vaginal examination whether the anterior and posterior fornices are in their normal position or are driven down. If the anterior fornix is obliterated and the posterior fornix normal, there will be an hypertrophy of the intermediary portion of the cervix.

When the prolapse is complete, the external covering of the tumor can be distinguished as the vaginal wall by its smooth, dry surface and remains of columnæ rugarum. The external os is at the apex of the tumor. By palpation the body of the uterus can be felt, and it is characteristic in shape. A sound introduced into the cavity is a convincing proof after fornices of the vagina are obliterated.

The uterus is usually enlarged and the cervix hypertrophied and eroded in complete prolapse. A sound introduced into the bladder through the urethra reveals the extent to which the bladder is displaced.

For what conditions may prolapse be mistaken?

(1) Hypertrophies of the cervix without prolapse; (2) prolapse of the vagina; cystocele and rectocele; (3) prolapse of an inverted uterus; (4) uterine polypus; (5) tumors of the vagina or vulva.

One diagnostic mark of prolapse is that the tumor is reducible, but the diagnosis should first be made before reduction.

What is the treatment?

Prophylactic: By preventing laceration of the perineum, and by timely and appropriate treatment of retroversions.

Immediate: (1) Replace the uterus, and keep it in position by pessaries or operations; (2) amputation of the cervix; (3) vaginal hysterectomy.

Reposition in difficult cases is best accomplished in the knee-elbow position. When first replaced the uterus is usually in retroflexion, and the reposition should be completed by the hand on the abdomen. A cradle pessary or an Albert Smith in slight prolapse, without rupture of the perineal body, will usually suffice to retain the uterus.

The various operative measures for cure of prolapse are—(1) repair of the perineum and narrowing of the vulva by uniting the lower portion of the labia majora (episio-perineorrhaphy); (2) narrowing of the vagina (colporrhaphy); (3) combination of the above methods; (4) peritoneal fixation and Alexander's operation; (5)

amputation of the cervix alone or with any of the above; (6) vaginal hysterectomy (extirpation of the uterus).

Repair of the perineum and uniting the lower portion of the labia majora are indicated in cases of slight prolapse with a torn perineum.

When the prolapse is more extensive a combination of Hegar's posterior colporrhaphy and perineorrhaphy with a Martin's ante-

FIG. 59.



Diagram representing some of the Minor Forms of Uterine Displacement.

rior colporrhaphy will in the majority of cases suffice to hold the uterus in position. Amputation of the cervix is indicated in hypertrophies of the latter.

Vaginal hysterectomy is only resorted to in those cases of complete prolapse where other means of treatment seem useless.

Describe briefly the minor displacements of the uterus mentioned under Varieties.

Elevation results from myomata, ovarian cysts (especially those

between the folds of the broad ligaments), haematocele, cicatricial contraction in the folds of Douglas, and superior fixation, due to perimetritic adhesions after pregnancy.

Anteversion, due to retro-uterine tumors, chiefly pelvic haematocele.

Retroposition is due usually to peri- and parametritic inflammations.

Latero-positions, versions, and flexion are usually due to inflammatory exudations and tumors to one or other side of the uterus or to arrests of development.

ACUTE METRITIS.

Define acute metritis.

An acute inflammation of the parenchyma of the uterus (muscular and connective tissue).

What are its causes ?

Almost always septic.

(a) Sepsis after labor or abortion ; (b) sepsis from other causes (as after the sudden evacuation of a large amount of retained secretions), from the use of sponge tents, from any operation upon the uterus without antiseptic precautions ; (c) acute endometritis ; (d) acute perimetritis ; (e) intra-uterine injections or stem-pessaries ; (f) caustics and cutting instruments used within the uterine cavity ; (g) exposure to cold and wet at menses ; (h) excessive coitus, especially at menses ; (i) gonorrhœal infection ; (j) direct injury ; (k) rarely from a simple vaginal pessary.

What is its pathology ?

It generally includes more or less endometritis and perimetritis. The uterus is hyperæmic, infiltrated with serum and leucocytes, and is soft and succulent. There may be ecchymoses. There may, in addition, be small collections of pus or abscesses of considerable size. There is catarrhal endometritis with its characteristic discharge.

What are its symptoms ?

Sudden, sharp chill ; fever, 103° or 104° F., usually of a sthenic type, with a full rapid pulse ; pain, heavy and dragging ; also a good deal of intermittent, sharp pain (peritonitic) ; vesical and rectal tenesmus ; uterus extremely sensitive to the touch ; discharge

due to the endometritis; nausea and vomiting (especially if peritonitis exists).

What is the course of the disease?

(1) Mild cases may recover completely in a few days or may leave a chronic metritis. (2) Cases with formation of abscesses have repeated chills, irregular rise of temperature, sweating. The abscess, if small, may disappear. A large abscess—1, may become encapsulated; 2, may rupture into the peritoneal cavity—usually fatal; 3, may rupture into the uterine canal, when the prognosis is favorable; or, 4, may rupture into the rectum, bladder, or through the abdominal wall.

Upon what is the diagnosis based?

(1) Upon the cause and symptoms; (2) upon the physical signs. These are tenderness on pressure or on attempting to raise or depress the uterus; enlargement, chiefly antero-posterior, giving the uterus a globular feel, such as it presents in early pregnancy.

What is the prognosis?

The *prognosis* is grave, owing to the danger of abscess-formation.

What is the treatment?

(1) In the early stages antiphlogistic: long-continued hot vaginal douches; leeches applied to the groins; ice-bag over the hypogastrium; recumbent posture with the hips elevated; a cathartic (castor oil). If due to sepsis, the uterine cavity should be repeatedly irrigated with 1:40 carbolic; opium is required to relieve pain.

(2) In the later stages, essentially a chronic metritis, hot vaginal douches; glycerin tampons; scarification of the cervix.

(3) When an abscess forms, wait until it points; then incise it. But where it is distinctly extending toward the peritoneal surface, it is better not to wait, but at once to evacuate it through the uterine canal or the vagina.

CHRONIC METRITIS.

Define chronic metritis.

An enlargement of the uterus, due to an increase in connective tissue, and in which the uterus is sensitive to pressure. (This includes subinvolution.)

What different opinions are held in regard to its occurrence ?

(1) Some authors say that it never occurs; (2) some say that it is the most frequent disease of women; (3) Seifert considers it merely subinvolution; (4) Klob, followed by Thomas, considers it merely areolar hyperplasia following long-continued congestion; (5) Tuttle's definition is as stated above.

What are the predisposing causes ?

(1) Any disease, acute or chronic, impairing the general health; (2) frequently-repeated parturition or abortion.

What are the existing causes ?

A. Those producing subinvolution: (1) Getting up too early after parturition; (2) retention of placenta, membranes, or clots; (3) pelvic peritonitis or cellulitis; (4) laceration of the cervix; (5) all forms of septic infection; (6) early resumption of hard work; (7) early resumption of coitus; (8) non-lactation; (9) abortion if the woman gets up and resumes sexual relations too early. As a result of these the retrograde metamorphosis does not take place, and the uterus is left with an abnormal amount of connective and muscular tissue.

B. Causes producing constant or repeated active hyperaemia: (1) Excessive coitus; (2) intercourse with impotent men; (3) cold douches to prevent conception; (4) masturbation; (5) obstructive dysmenorrhoea; (6) neglected gonorrhœal endometritis.

C. Those producing passive congestion: (1) Interference with the general circulation by lesions of the heart, lungs, or liver; (2) local obstruction by tumors or inflammation (especially by habitual distension of rectum or bladder).

D. Comparatively rarely has been preceded by acute metritis.

Describe its pathology.

There is a proliferation of connective tissue, chiefly localized about the blood-vessels. There is no noticeable increase of muscular tissue. The lymphatic spaces are dilated. The uterus is always enlarged, but not usually very greatly.

In the *first stage* the new connective tissue is being produced. The uterus is enlarged, globular, antero-posterior diameter increased, and is soft and succulent. It thus resembles the uterus in early pregnancy. The mucous membrane is congested.

The *second stage*, or the stage of cirrhosis, is not often observed. The new connective tissue contracts, forming irregular bands or

cicatrices or nodules. This tends to obliterate the blood-vessels, and, as the arteries are comparatively thick-walled, the venous circulation is most impaired. The size of the uterus may be diminished. It is firm and white, cutting almost like cartilage. The uterine cavity is larger than normal.

As to *site*, chronic metritis may be general or may be confined chiefly to either the body or the cervix.

Describe chronic metritis of the cervix alone.

This is found in cases of uterine or vaginal prolapse. In the first stage the os externum is engorged and patulous, the lips are separated, and the mucous membrane everted. In the second stage the cervix is hard, irregular, and nodular; the lips are broad and thick; there is chronic cervical catarrh. The nodular masses in the cervix are characteristic, and closely resemble commencing carcinoma.

What are the symptoms of subinvolution resulting in chronic metritis?

The trouble dates from a labor or abortion (especially abortion, as the patient gets up too early, that her friends may not suspect the nature of the trouble, and is also apt to resume intercourse too early).

a. In the early stages there are—(1) a sense of weight and pressure and dragging pain, increased by walking or standing; (2) pain in the hypogastrium or groin (apt to place hand over pubes to support the uterus): patients cannot ride over rough pavements, and they walk carefully; (3) vesical irritability; (4) obstinate constipation; (5) leucorrhœa and menorrhagia or metrorrhagia; (6) dyspareunia; (7) many of the signs of pregnancy (often there is morning vomiting, the breasts may be enlarged and pigmented, and the patient may have the subjective symptoms of pregnancy), but there is no cessation of menstruation.

b. In the later stages there are occasional acute exacerbations, each leaving the uterus a little larger. These are—general debility; pains (sciatic, sacral, or coccygeal), neuralgias, headaches, sterility, or repeated abortions.

What are the symptoms of chronic metritis from congestion?

There is, first, dysmenorrhœa, and in the course of years the general health is impaired and the uterus becomes enlarged, painful, and sensitive. There are leucorrhœa and menorrhagia or metrorrhagia. The patient finally presents the same symptoms as one in whom the chronic metritis originated in subinvolution.

What are the physical signs of chronic metritis?

a. Early stage: Uterus uniformly enlarged and sensitive; uterus usually prolapsed, and there is often retroflexion and fixation. The uterine cavity is always enlarged and more roomy. The uterine walls are doughy. The cervix in a nullipara is enlarged, swollen, and tapers to a point, where the os is patulous, eroded, and presents a plug of mucus. The cervix in a multipara is blunt and swollen, the os is broad and its lips are swollen and eroded. There is cervical catarrh.

b. Later stages: The cervix is indurated and nodular, and is larger than the body of the uterus. The body of the uterus is not sensitive to pressure.

What are the complications of chronic metritis?

Chiefly inflammatory. (1) Peritoneal adhesions and bands; (2) acute and chronic ovaritis; (3) distortions of the tubes (sometimes hydrosalpinx); (4) displacements of the uterus; (5) endometritis; (6) disturbances of menstruation.

What are the chief diagnostic features of chronic metritis?

(1) Uniform enlargement of the uterus; (2) sensitiveness; (3) pain; (4) chronicity.

From what conditions must you diagnose chronic metritis?

(1) Pregnancy; (2) fibroid tumors of the uterus; (3) carcinoma of the cervix.

Give the differential diagnosis between pregnancy and chronic metritis.

The symptoms common to both are morning vomiting, pigmentation and enlargement of the breasts, and changes in the cervix. But in pregnancy menstruation is absent, and in chronic metritis it is irregular and profuse.

What is Hegar's sign of pregnancy?

It is a change in the convexity of the posterior wall of the uterus (a slight bulging) above the vagina. It is excellent, but the exclusion of chronic metritis is essential.

Give the differential diagnosis between chronic metritis and fibroids.

a. In the case of a small submucous fibroid the uterus would not be sensitive, and the uterine cavity would be smaller. (In case of doubt dilate the os and examine the uterine cavity with the finger.)

b. With an interstitial fibroid the uterus is not sensitive, and, while the cavity of the uterus is enlarged, there are none of the other symptoms of chronic metritis. On bimanual examination a localized swelling of the uterine wall can be felt.

How would you diagnose carcinoma of the cervix from chronic metritis?

By the coexistent cancerous cachexia; by the age (carcinoma rarely occurring before thirty-five); by microscopical examination of a portion cut from the cervix.

What is the course of the disease?

Exceptionally it may give no serious trouble, but generally it undermines the health. Many get worse at the menopause, and then get practically well, but some go on for ten years longer, with profuse and irregular menstruation. The few cases that pass into the stage of cirrhosis are freed from almost all the troublesome symptoms.

What is the prognosis?

When confined to the cervix it may be cured. When the whole uterus is involved there is little danger to life, but the prospect of cure is very poor. Some few cases are spontaneously cured by passing into the second stage. The only danger is from hemorrhage or peritonitis.

What is the prophylaxis?

* Remaining in bed until the fundus is at the level of the symphysis; remaining in bed seven or eight days after abortion; lactation if possible.

What is the curative treatment?

(1) Remedy existing causes of congestion (catarrh of the cervix, laceration, and displacements).

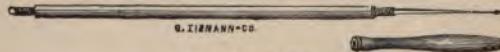
(2) *General Treatment.*—Bowels and bladder regulated; diet wholesome and nutritious; iron if anaemic (strychnine, iron, and quinine form an excellent tonic); ergotin in doses of $\frac{1}{4}$ grain three times a day is almost a specific; baths, but never cold nor sea-baths; change of climate is often beneficial.

Weir Mitchell's treatment consists in absolute rest, a stuffing diet, electricity, and passive motion. The patient lies perfectly still; does not make a voluntary motion, so much as even to raise a hand, for two months; receives a very liberal diet, and the nutri-

tion is maintained by electricity and passive motion daily. This is rarely practicable, and where it is not the best treatment consists in moderate exercise in the open air (a walk of a mile or two daily, no driving or riding), having the patient keep at her ordinary work, but avoiding straining or heavy lifting. Restrict sexual intercourse, but it is often not best to prohibit it. (Do so, of course, if it causes prostration or aggravates the symptoms.) Support the uterus by a suitable pessary. Remove pressure from above by the use of suspenders, loose waistbands, and a well-fitting abdominal belt. Regulate the bowels (this is very important): the diet should not be of too great bulk and should be laxative; fresh fruits are especially desirable. An enema of 1 or 2 drachms of glycerin (undiluted) every night or morning causes a satisfactory movement of the bowels, and is free from any objectionable effects.

(3) *Local Treatment.*—*a. Local Depletion.*—Scarification, puncture, leeches. Scarification or puncture may be done twice weekly; neither is contraindicated by any degree of anaemia, and each is very effective; especially useful a few days before menstruation. For scarification: longitudinal incisions in the cervical mucous membrane: a straight bistoury is used; and for puncturing: an instrument called Buttle's spear is thrust into the cervix to the

FIG. 60.



Buttle's Spear.

depth of one-fourth of an inch in a number of places. The amount of blood drawn should be 3ss to 3ij. Hemorrhage is readily checked by the application of alum or tannin. It is not necessary to apply suction, as by cups. (Do not tell the patient what you are doing, but tell her that the tampons will be stained.) Leeches are applied through a cylindrical speculum. The cervix is first plugged with a bit of cotton, and then punctured. Leeches are uncertain as to the amount of blood they will withdraw, and there is a liability to profuse subsequent hemorrhage.

b. Vaginal Douches.—Prolonged injections of hot water, 100° to 110° F., or of hot salt solution, are very beneficial in all conditions where there is congestion.

How should a vaginal douche be administered?

“The injection can be better given after the patient is undressed

for the night and in bed. She should be placed near the edge of the bed, with the hips elevated as much as possible by the bed-pan, and a small pillow under her back, the lower limbs being flexed. Her body must be covered to protect her from the cold, and her position made perfectly comfortable: whenever the bed is a soft one, for the purpose of keeping the hips elevated a broad board should be placed under the pan to prevent it from sinking into the bed from the weight of the patient. The vessel of hot water is placed on a chair by the bedside, and the nurse passes the nozzle of the syringe into the vagina, over the perineum, directing it along the recto-vaginal wall until it has reached the posterior cul-de-sac. The water must be thrown in at first very carefully, until the vagina has become distended" (Emmet).

A fountain syringe may be used instead of the bulb syringe, as above described, and in every case the perforations in the nozzle used should be lateral, to avoid the danger of the fluid being injected into the uterine cavity.

c. Tampons.—The most useful are glycerin tampons, with chloral or iodoform as an anodyne. Tampons impregnated with alum are not so desirable, as their astringent action cannot be limited to the cervix, but extends to the vagina.

d. Counter-irritation.—This is best effected by tincture of iodine or Churchill's tincture, diluted one-half with glycerin and applied to the entire mucous membrane of the uterine canal. The canal is first moderately diluted by graduated sounds; then an applicator wound with cotton soaked in the solution is passed rapidly into the uterine canal and allowed to dry there (always protect the vagina from the excess). Then freely paint the vaginal surface of the cervix with tincture of iodine. (A glycerin tampon should then be introduced, to be removed by the patient in twenty-four hours.) The solid stick of nitrate of silver may be passed into the uterine cavity, or the cervix may be blistered by painting its vaginal surface with cantharidal collodion. But these measures are not often necessary.

e. Operations.—(1) Martin's operation consists in amputation of the anterior lip of the cervix. It will often cause reduction in the size of the entire uterus. The objection to it is the distortion produced. (2) Emmet's operation, or trachelorrhaphy, is for the repair of laceration of the cervix, and is often followed by brilliant improvement. It is the one to be chosen in most cases. (3) Schroefer's amputation of the cervix consists in the removal of a circular

wedge and suturing the vaginal to the cervical mucous membrane. It is effective and is to be preferred in some cases.

APPLICATIONS THROUGH THE SPECULUM.

(A) *In substance* (stick, crystals, or powder):

1. Nitrate of silver, 2. Caustic potash, 3. Chloride of zinc, 4. Chromic acid, 5. Alum, 6. Tannin, 7. Persulphate of iron, 8. Sulphate of copper, 9. Iodide of lead, 10. Iodoform, 11. Hydrate of chloral, 12. The bromides.	<div style="display: flex; justify-content: space-between;"> <div style="flex: 1;"> are escharotics, and must not be kept in contact with the cervix or vagina. </div> <div style="flex: 1;"> may be kept in contact with the cervix for several hours. </div> </div>
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(B) *Fluids*:

Escharotics.	Nitric acid, fuming. Chromic acid, sat. sol. in water or diluted. Bromine sol. in alcohol, 1 : 5 or 10. Acid nitrate of mercury (sat. sol.). Chloride of zinc (sat. sol.). Nitrate of silver in strong solution, $\frac{3}{2}$ — $\frac{5}{2}$. Carbolic acid, pure.
Caustics.	Iodized phenol, carbolic acid, tr. iodine, equal parts. Acetic acid, pure. Pyroligneous acid (crude or rectified). Sol. of perchloride of iron. Sol. of persulphate of iron (Monsel's). Sat. sol. of alum. Sat. sol. of acetate of lead. Sat. sol. of sulphate of zinc. Sat. sol. sulphate of copper. Glycerites of alum and tannin. Fluid extract of pinus Canadensis. Fluid extract of hydrastis Canadensis. Fluid extract of eucalyptus globulus. Fluid extract of witch hazel. Bismuth and glycerin.
Astringents and Styptics.	

Alteratives.	Tincture of iodine.
	Compound tr. of iodine.
	Churchill's tincture of iodine.
	Sol. of iodide of potash.
	Sol. of iodoform in glycerin.
	Impure carbolic acid and glycerin, equal parts.
	Sol. of nitrate of silver, gr. x-3ss to $\frac{3}{2}$ j.
	Sol. of chromic acid, $\frac{3}{2}$ j to $\frac{3}{2}$ j of water.
	Sol. of sulphate of zinc, 10 per cent.
	Sol. of sulphate of copper, 10 per cent.
Narcotics.	Sol. of persulphate of iron, with glycerin, equal parts.
	Sol. of perchloride of iron, with glycerin, equal parts.
	Tincture of belladonna.
	Tincture of hyoscyamus.
	Tincture of opium.
	Tincture of conium.
Hydragogue.	Sol. of chloral hydrate.
	Sat. sol. of bromide of potassium.
	Sat. sol. of bromide of sodium.
	Sat. sol. of bromide of ammonium.
	Cocaine.
	Glycerin.
	Corrosive sublimate, 1 : 2000.
Disinfectants.	Carbolic acid, 1 : 50.
	Boracic acid, sat. sol.
	Chlorine-water.
	Chlorinated soda.
	Bromo-chloralum.
	Thymol.
	Permanganate of potash.

ENDOMETRITIS.

What are the varieties ?

(1) Acute ; (2) chronic.

ACUTE ENDOMETRITIS.**What are its definition and occurrence ?**

It is an acute inflammation of the mucous membrane of the uterus, and is usually general—*i. e.* not confined to the cervix or to the body exclusively. It is not very common, and is said never to occur before puberty.

What are its causes ?

(1) Gonorrhœal infection (there is not necessarily any antecedent infection of the vagina or urethra, but this is quite often the case). (2) Injurious influences during menstruation (cold, local injuries, as by stem-pessaries, sounds, and intra-uterine applications). (3) It may complicate typhus fever, small-pox, measles, etc. (4) Sepsis after labor or abortion.

What is its pathology ?

The mucous membrane is red and thickened; it is soft and velvety, and can be stripped off with a scalpel. It presents small ecchymoses. The body is more affected than the cervix. The latter is soft, dark red or purplish, and presents a ring of small superficial erosions about the os. Secretion is increased. That from the body is at first serous, but later becomes cloudy from desquamated epithelium, which under the microscope is seen to form casts of the tubular glands. The secretion from the cervical canal is yellowish-green or rusty, according to the preponderance of pus or blood. It excoriates the vagina and vulva.

What are the complications ?

Acute salpingitis, acute metritis, acute peritonitis, vaginitis.

What are the symptoms ?

(1) Chill not present in the majority of cases. (2) Rise of temperature to 100° or 101° F. (3) No pain unless there are complications. (4) After two or three days increased secretion of the character above described. (5) In gonorrhœal or severe septic cases we have added nausea, vomiting, pain, vesical tenesmus, and tympanites.

What are the physical signs ?

(1) Bimanual examination shows the uterus to be of normal size and slightly sensitive. (2) The sound should never be used in an acute process like this, especially if gonorrhœal or septic. It would show great sensitiveness at the os internum and at the fundus, and

its use would be followed by marked hemorrhage. (3) The use of the speculum would show the os patulous, with aropy secretion, and the cervix either simply reddened or dark purple, or with extensive superficial erosions.

What is the prognosis?

Doubtful if septic or gonorrhœal, because of the liability to complications. In other cases the *prognosis* is good if the patient will take proper care of herself.

What is the course?

The fever subsides in a few days, but the discharge continues two or three weeks. If neglected it may pass into chronic endometritis.

What is the treatment?

(1) Rest in bed should be insisted upon while the acute symptoms last. (2) Cathartics, if required to keep the bowels free. (3) Pain if present is treated by hot hypogastric fomentations, and Thomas uses opium. (4) Vesical irritation is treated by mineral waters and the salts of potash. (5) When the discharge becomes purulent simple vaginal douches are given (plain water or with some astringent). (6) Depletion, as by leeches or cups, is never indicated.

CHRONIC ENDOMETRITIS.

How frequent is its occurrence?

It is perhaps the most common of gynecological diseases. It may be limited to either the body or the cervix of the uterus, or it may be general.

CHRONIC CORPOREAL ENDOMETRITIS.

What are its causes?

(1) Those producing active hyperæmia. (2) Those producing passive congestion. (3) It may be consequent upon acute endometritis.

The causes most frequently operating are—1, sexual excesses; 2, local irritation by too hot or too cold vaginal injections or by injudicious treatment by gynecologists; 3, displacements of the uterus, especially prolapse, and in virgins flexions and stenosis; 4, neoplasm, especially fibroids; 5, gonorrhœa is the most important of all, and there need not necessarily be a history of vaginitis.

What is the pathology?

The mucous membrane is congested and thickened (may be $\frac{3}{5}$ inch, or even $\frac{1}{2}$ or $\frac{1}{4}$ inch, in thickness); there are superficial ecchymoses, which when old appear as yellow or brown or black spots; the surface is smooth, velvety, and of a pinkish hue, but may be thrown into folds or papillary masses completely filling the uterine cavity. The utricular glands are dilated, their mouths being blocked, and some may rupture.

What varieties are distinguishable microscopically?

- I. Glandular endometritis: 1, hypertrophic; 2, hyperplastic.
- II. Interstitial endometritis.
- III. Mixed endometritis.
- IV. Fungous endometritis.

Describe glandular endometritis.

(1) In simple or hypertrophic glandular endometritis there is marked proliferation of the epithelium lining the utricular glands. Thus the glands become distorted and their walls are thrown into dentate elevations. As seen from the surface, the mouths of the glands are irregularly stellate.

(2) In hyperplastic glandular endometritis new glands are added, and may be so numerous as to fairly honeycomb the mucous membrane. They may be diverticula from the general surface or from the old glands.

Describe interstitial endometritis.

It is chiefly cellular in the early stages. The round cells of the stroma are increased in size and number, and have large nuclei. Later the cells become spindle-shaped, the nuclei oval and less well defined, and finally dense connective tissue results, which compresses and distorts the glands. If the intercellular substance is principally affected, there is marked production of dense new connective tissue; the glands are after a time obliterated and the secretion destroyed.

Describe mixed or diffuse endometritis.

All the elements of the mucous membrane are involved, but to different degrees at different parts of the surface. This is the most common form.

Describe fungous endometritis, or fungoid degeneration of the endometrium.

This is a clinical class in which a certain number of growths (uterine fungosities) occur as a result of an endometritis (most often mixed, but it may be glandular or interstitial). To the naked eye these look like white or red currants; they are very vascular and bleed readily. They may be sessile or pedunculated. Microscopically, they consist merely of hyperplastic mucous membrane. They are said to occur almost exclusively after labor, or especially after abortion, as the result of chronic endometritis set up by retained bits of placenta.

What are the symptoms?

(1) Hemorrhage is the characteristic symptom. (If the discharge is purulent, it probably comes from the Fallopian tubes; if there is a free watery discharge, the existence of a tumor is to be thought of.) There is profuse menstruation and irregular hemorrhage between the periods.

(2) Pain is excessive at the periods, especially in the interstitial form. (In the glandular form hemorrhage is the most prominent symptom.) (a) Dysmenorrhœa, severe colicky pains, and there may be membranous dysmenorrhœa, especially in virgins. (b) "Middle pain" is a sudden uterine colic occurring halfway between the periods. (c) Constant pain with exacerbations. (d) Others feel best at or after menstruation (especially those with free flowing). (e) Indefinite pain.

(3) *Sensibility to the Sound.*—There are great pain and hemorrhage on passing the sound. The greatest sensitiveness is at the os internum and at the fundus.

(4) *Sterility* or a tendency to abortion.

(5) Symptoms like those of pregnancy—"morning sickness," changes in the breasts.

(6) *Disturbance of Digestion.*—True dyspepsia or a nervous form characterized by a capricious appetite and distress after eating.

(7) *Disturbance of the Nervous System.*—Melancholia or some change of temperament.

What is the diagnosis?

(1) History. (2) Uterine sound: (a) Glandular. The cavity is lengthened and more roomy. Sensitiveness is not extreme. Rough excrescences can be felt at various points. (b) Interstitial.

The cavity is narrow, and the sound cannot be turned from side to side. The mucous membrane is pretty smooth, but not elastic, and there may be fungosities. (c) Fungous. The roughnesses are felt at once. They may be scraped out and the fungosities examined.

What are the complications?

In nulliparæ it is not apt to be complicated except in gonorrhœal cases, where the inflammation may extend to the tubes and peritoneum. In multiparæ it often causes metritis, cervical catarrh, vaginitis, displacements of the uterus, or pruritus vulvæ.

What is the prognosis?

Best in recent cases: glandular; uterus, not much enlarged; cavity roomy; not much connective-tissue formation; not much debility.

Bad in old cases: glands mostly deformed or obliterated; menstruation scanty; pain excessive; general health undermined. (In fifty per cent. of all cases the climacteric brings no relief at all.)

What is the treatment?

General.—Tonics and hygiene (especially regulation of bowels, bladder, sexual relations); treat displacements if present; use of ergotine if the uterus is enlarged.

Local.—(1) Ointments may be introduced by a long syringe and left to melt in the uterine cavity. They are unscientific, uncertain, and useless. Those which have been tried contained lead, bismuth, iodoform or calomel combined with cocoa butter.

(2) Solid alteratives; pencils or suppositories containing iron, alum, tannin, or copper. (The best method is by fusing the substance on the end of a copper wire. It takes four or five minutes to melt inside the uterus.) These are not very valuable.

(3) Solutions are excellent. The cervix is thoroughly dilated (*e. g.* by a cervical speculum), and an applicator, wound with cotton saturated with the solution, is passed quickly into the uterine cavity. The uterus contracts, and it is necessary to wait a few seconds for it to relax before withdrawing the applicator. The most desirable applications are—*a.* Tincture of iodine, pure; *b.* Churchill's tincture of iodine, pure or with 50 per cent. glycerin; *c.* Battley's solution (iodine, alcohol, and carbolic acid); *d.* Liq. ferri persulph., or liq. ferri sesquichloridi (each with 50 per cent. glycerin); *e.* Saturated solution of zinc or copper sulphate. Others are

nitrate of silver or chromic acid, gr. xx- $\frac{2}{3}$ j, and crude carbolic acid. Be sure there is room for the fluid to escape, else it may be forced into the tubes.

(4) The dull curette (Thomas's wire curette, Fig. 61) is used for the removal of fungosities. The cervix is moderately dilated, and then every portion of the surface of the endometrium is gone

FIG. 61.

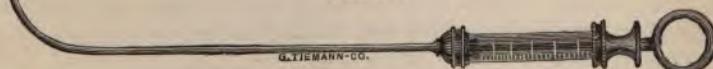


Thomas's Wire Curette.

over with the wire loop. Then a single application is made of a solution of either chromic acid, nitrate of silver, sulphate of zinc, sulphate of copper, persulphate of iron, chloride of zinc, tincture of chloride of iron, or carbolic acid. The operation can be done without an anæsthetic.

(5) *Intra-uterine Injections*.—The syringe is long, with lateral orifices. The fluids injected are—tincture iodine; tincture iodine,

FIG. 62.



Applicator Syringe for Fluids or Ointments.

Churchill's; nitrate of silver, $\frac{2}{3}$ ss or less to $\frac{2}{3}$ j; pyroligneous acid; solutions of iron, copper, or zinc salts.

Contraindications.—(1) Never employ this method without having the cervix fully dilated, and never in cases of acute flexion. (2) Never just before, during, or just after menstruation. (3) Never if there is acute inflammation in or about the uterus.

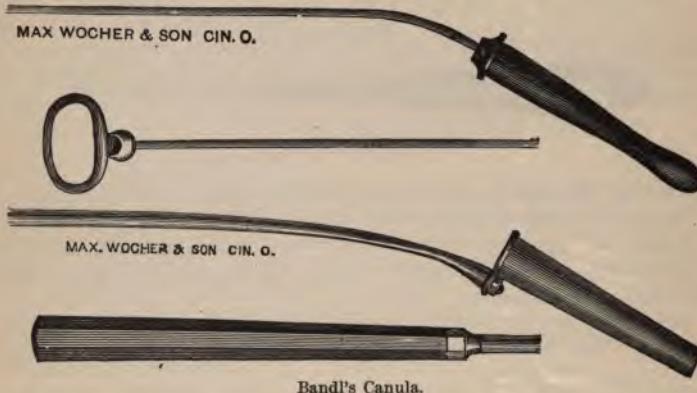
Dangers.—(1) Uterine colic and slight collapse. (2) Fluid may pass out through the tubes into the peritoneal cavity. (3) Or into the veins and produce acute phlebitis. (4) Entrance of air into the veins.

Rules.—(1) Fluid should be at least 80° or 90° F.; (2) exclude air; (3) bladder and rectum empty; (4) confine patient to bed for a few hours afterward.

Methods.—(1) Bandl's canula, pyroligneous acid. A double tubu-

lar speculum is introduced (a long speculum with a short wide one); the cervix is seized by a tenaculum and drawn well down, the long inner speculum being removed. Bandl's canula is introduced about one-fourth of its length into the uterine cavity; the

FIG. 63.



cylindrical speculum is filled with crude pyroligneous acid, and the canula is pushed on into the uterus.

(2) Tincture of iodine, ten or twelve drops introduced into the uterine cavity through a long uterine syringe with pinhole lateral orifices.

(3) In old, long-standing cases dilate the cervical canal thoroughly, and irrigate the uterine cavity with 3 per cent. carbolic acid by means of the Fritsch-Bozeman intra-uterine catheter. Then scrape out the entire endometrium with a sharp curette.

The patient should remain in bed for four or five days, and then ten or twelve drops of pure tincture of iodine are injected, and the patient may get up twenty-four hours later. The injection of tincture of iodine should be repeated twelve times, at intervals of two or three days.

Some objections urged against this last method are—

(1) That it is dangerous. (It is not dangerous if performed with antiseptic precautions.) (2) That it is impossible to scrape out the endometrium. (Others say that they can do it.) (3) That

it causes sterility. (This is not true: furthermore, it sometimes cures sterility.)

Menstruation is generally absent the first two periods after this treatment, but returns at the third period.

CHRONIC CATARRH OF THE CERVIX (CHRONIC CERVICAL ENDOMETRITIS).

What is the occurrence ?

It is the most common gynecological disease. In virgins and nulliparæ it is limited to the mucous membrane; in multiparæ the inflammation involves all parts of the cervix.

What are the causes ?

I. *Predisposing*.—(1) Long conical cervix (in nulliparæ); (2) general debility from rheumatism, gout, tuberculosis, nephritis, chlorosis or anaemia, bad surroundings, and exposure; (3) frequent parturition.

II. *Exciting*.—(1) Immoderate sexual intercourse; (2) attempts to prevent conception; (3) intercourse with impotent men; (4) masturbation; (5) extension of inflammation from vagina or body of uterus; (6) stenosis of os externum; (7) local injuries, mechanical and chemical; (8) labor (laceration and subinvolution) is the most common cause in multiparæ.

What is the normal histology of the cervix ?

There is no serous coat. The muscular is quite subordinate to the connective tissue, and does not form layers. Then come the mucous membrane; a submucous layer, which does not exist in the body of the uterus; and the parenchyma.

The *mucous membrane* is paler and firmer than in the body. It presents anteriorly and posteriorly an *arbor vitæ*. These are formed by an anterior and a posterior median pillar with countless lateral rugæ, and these and the grooves between them are still further subdivided, so that the surface presents ever so many minute depressions or crypts, and everywhere there are seen the mouths of the glands, which number about ten thousand. The glands are simple, tubular, or bottle-shaped, or compound racemose, and open into the crypts. The *Nabothian glands* are glands of any of the above forms, the mouths of which have been occluded and the secretion retained. The glands are lined by cuboidal epithelium. The general surface is covered by a single layer of cylindrical

epithelium which is ciliated (in the depressions only) from the internal to the external os. It is continuous with that lining the glands, and at the external os changes abruptly to flat epithelium. The vaginal surface of the cervix is covered by stratified pavement epithelium, beneath which there are papillæ and no glands; it is thus very much like a cutaneous surface. The cervix is poorly supplied with spinal nerves (hence is relatively insensible), but richly with sympathetic nerves.

What is the pathology?

In simple recent cases the mucous membrane is congested, thickened, and softened. There is increased discharge. In old, long-standing cases—(a) There is a *proliferation of the epithelial cells*. This is always in a single layer, and results in an increase in the surface of the mucous membrane in several ways: (1) Chiefly by the cylindrical displacing the flat epithelium on the vaginal surface, thus producing "erosions." (2) At certain points on the vaginal surface the flat epithelium desquamates, leaving exposed the cuboidal epithelium covering the papillæ, and this in turn changes to cylindrical epithelium. The surface is thrown into folds separated by deep clefts, forming really new glands. The effect of all these is the creation of a large additional secreting surface.

(b) The *glands* are chiefly occluded (both old and new glands), and the contents of these retention cysts may be—1, ordinary secretion; 2, pus; 3, caseous material; or, 4, chalky concretions. Each one is about the size of a pea, and may extend toward the cervical canal or toward the vaginal surface, where are normally no glands, and there form knobs.

Cystic degeneration of the cervix is the name given to those cases in which such occluded glands occupy the greater part of the cervix, including its vaginal aspect.

What are the varieties of erosions of the cervix?

(1) Simple; (2) papillary; (3) follicular.

(1) *Simple Erosions* are bright-red spots on the vaginal aspect of the cervix, where the flat epithelium has been replaced by cylindrical. They set up a continuous and protracted discharge, and should always be treated.

(2) *Papillary Erosions* differ from simple erosions only in the fact that the mucous membrane is furrowed by crypts which leave papilliform eminences. The furrows are sometimes so deep as to

simulate lacerations of the cervix, and might cause unpleasant complications in the case of an unmarried woman.

(3) *Follicular Erosions* are like simple erosions, with the addition of retention cysts, some of which may have ruptured.

Coxcomb Granulations are the hypertrophic folds or ridges of the cervical mucous membrane which occur in all long-standing cases.

What are the symptoms of cervical catarrh?

(1) *Pain* is not a prominent symptom: it is often wholly absent. Later, especially with hypertrophy, there is dull pain in the back (lumbar and sacral) and pelvis. With retention cysts there is constant burning pain in the cervix.

(2) *Dyspareunia*: severe itching and burning follow sexual intercourse.

(3) *Discharge* may be absent. In simple cases it is clear and viscid; in old cases, turbid, purulent, and more viscid; in the worst cases extremely viscid and elastic.

(4) *Sterility*, the discharge acting as a mechanical barrier.

(5) *Debility*, as the discharge may be a constant drain on the system.

(6) *Vesical irritability*.

(7) *Constipation*.

(8) *Functional Disturbances*: (a) Reflex congestion of ovaries and uterus (menorrhagia or metrorrhagia); (b) neuralgia, headache, sometimes hysteria.

What are the physical signs?

In Virgins.—There may be a long, narrow cervix, which is enlarged, sensitive, and succulent. No erosions. On dilating the os the cervical canal is found dilated and filled with coxcomb granulations. Abundant discharge. In another class of cases the os is rather wide, and there are large papillary erosions which resemble a laceration or eversion of the cervix.

In Multiparae.—The lips of the cervix are usually lacerated and the mucous membrane everted, with possibly deep clefts and the formation of cysts. The last are better felt than seen.

What is the diagnosis?

(From catarrh of the body of the uterus.) (1) The cervix alone is tender; (2) presence of erosions; (3) thick tenacious discharge.

What is the course?

Exceedingly slow, and showing no tendency toward spontaneous recovery. A certain number of cases are followed by carcinoma of the cervix. It is often impossible to distinguish under the microscope between an erosion which is healing and carcinoma.

Is the prognosis good?

Yes, if the case is properly treated.

What is the treatment?

It may be—(a) General.—Remove the regular causes; improve hygienic conditions; limit sexual intercourse; regulate the bowels and bladder; and remedy displacements of the uterus. Or

(b) Local.—1. For *Simple Erosion*.—(1) Emollient vaginal douches, salt, bran, starch, linseed oil, tincture of opium, or belladonna in warm water. (2) Applications: the best is pyroligneous acid, poured into a tubular speculum, so as to bathe the cervix for a few minutes. This is done three times a week.

2. For *Papillary Erosions*.—Cut them away with scissors, and treat the base with nitrate of silver or chromic acid.

3. For the *Cervical Canal*.—Best, tincture of iodine, or Battey's solution (carbolic acid, alum, and iodine), or nitrate of silver.

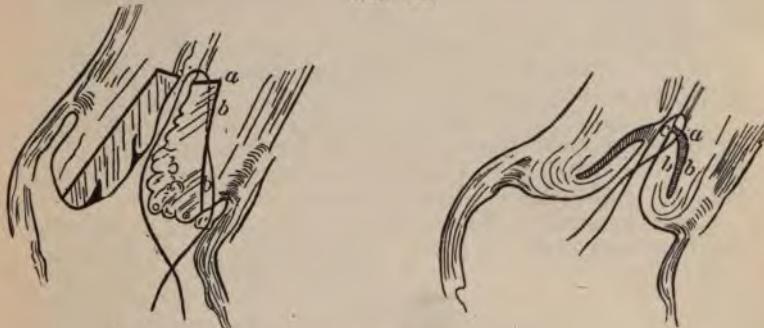
4. For *Cysts*.—Puncture them from the vaginal surface with a Buttle's spear or a tenotomy knife, and then bore into them with the solid stick of nitrate of silver.

5. For *Cases requiring Removal of the entire Mucous Membrane*.—(1) *Caustics*.—Clean away the secretion (best, a probe with cotton powdered with alum and used with a twisting motion). Introduce an applicator covered with cotton soaked in fuming nitric acid or with chromic acid. The applicator is left in until it dries. Later, repeated applications of nitrate of silver solution or of tincture of iodine are made to prevent exuberant granulations. (2) *Surgical Measures*.—Several longitudinal incisions are made through the mucous membrane, and two or three days later the entire cervical mucous membrane is scraped out with a sharp spoon. Pack a little iodoform gauze into the cervix, and introduce a vaginal tampon.

This cures all cases except those with extensive cystic degeneration, and is more desirable than the use of caustics, which is often followed by cicatricial stenosis. It can be done in the office or dispensary. (Of course the after-treatment consists in alterative applications to prevent excessive growth of the mucous membrane.)

6. For an *Extensive Laceration*.—Emmet's operation.
7. For *Great Cystic Degeneration*.—Schroeder's operation. By this method cases can be cured which are otherwise incurable.

FIG. 64.



Schroeder's Operation.

Its only disadvantage is that it leaves the cervix shorter than normal.

LACERATION OF THE CERVIX.

What is its occurrence?

It constitutes 32.8 per cent. of all gynecological cases. Perhaps some laceration always occurs during parturition, but in most cases it is slight, is not recognized at the time, and heals readily. It occurs in all stations of life, but in instrumental cases it is more frequent among the poor.

What are its causes?

(1) *Labor*.—Tedious, most frequent; precipitate; instrumental; manual delivery; rigid os and premature rupture of membranes; cicatricial or malignant tissue in cervix; incision of cervix for failure to dilate.

(2) *Abortion*.—Criminal.

What are its varieties?

Complete, partial, unilateral, bilateral, stellate.

A partial laceration extends only through the mucous and submucous layers, and leaves the vaginal surface intact.

What is its site?

Most frequently through the anterior lip a little to the left, due to pressure by the occiput in the first position.

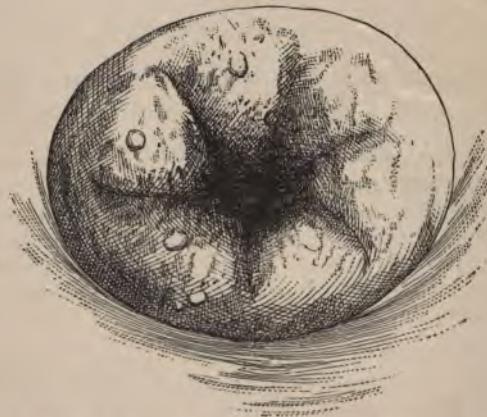
Next in frequency, double, anterior lip to the left and posterior lip to the right; bilateral; stellate; unilateral, more often to the left.

(1) Laceration of the anterior lip usually heals readily, because, as a rule, it does not extend into the pelvic connective tissue. If it does so, we may have vesico-cervical fistula.

(2) Laceration of the posterior lip as a rule heals readily, but it may extend into the connective tissue and produce cellulitis in one of the utero-sacral ligaments, resulting in contraction of the ligament and displacement of the uterus.

(3) Bilateral laceration constitutes the great bulk of the cases requiring treatment. It is very apt to extend into the connective

FIG. 65.



Multiple or Stellate Laceration of the Cervix (Emmet).

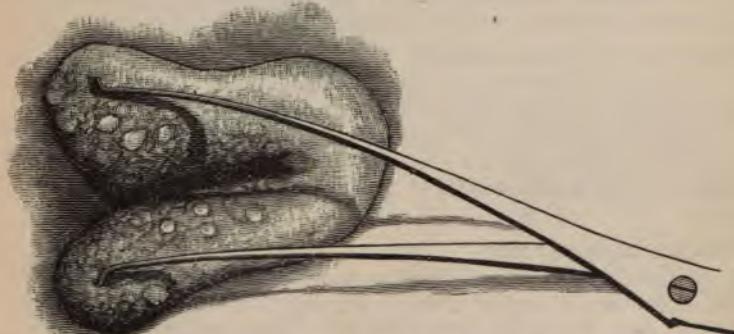
tissue of the broad ligaments, and we have cellulitis, interference with the circulation, causing ectropion, or, starting from the bottom of the tear, erosions of the cervix, subinvolution, and prolapse (especially if the perineum is lacerated), and retroversion, catarrh, cystic degeneration, and a cicatricial plug are produced. The latter

is a dense mass of cicatricial tissue formed at the deepest angle of the laceration by an incomplete attempt at healing by granulation. This tissue must be removed in any operation for repairing the laceration.

(4) Stellate laceration is usually superficial, and produces, as a rule, none of the special symptoms of laceration. There is no sterility, but, on the contrary, often unusual fecundity.

(5) Unilateral laceration does not produce the characteristic symptoms. The whole uterus is bent toward the injured side (contraction of ligaments consequent upon cellulitis); the anterior for-

FIG. 66.



Double Tenaculum separating the Flaps of a [Unilateral] Laceration (Emmet)

nix is as deep as the posterior. The uterine cavity may be apparently of the normal length.

(6) Partial laceration is about half a dozen longitudinal fissures through the mucous and submucous layers of the wall of the cervical canal. This sets up catarrh, and the cervix is somewhat enlarged, but its walls are thinner than normal. (This condition must be distinguished from the ridges and grooves produced by chronic cervical catarrh with coxcomb granulations.)

What are the symptoms of laceration of the cervix?

(1) *Pain*, lumbar and sacral; a dragging pain in the groins, and a bearing-down pain. All are increased by any effort, such as standing or walking.

(2) *Vesical Irritability*, very frequent micturition.

- (3) *Dyspareunia*, and sometimes hemorrhage after intercourse.
- (4) *Leucorrhœa*, profuse and constant.
- (5) *Menstruation* is at first simply profuse; later it is irregular as to time, and usually profuse, but may be scanty.
- (6) *Sterility*. Later symptoms:
- (7) Anæmia and headaches (occipital and at the nape of the neck).
- (8) Neuralgiæ, insomnia, change of temperament, melancholia.

What are the physical signs?

Digital examination is unreliable. Bivalve speculum and a tenaculum in each lip give ocular demonstration of the laceration. (It is sometimes impossible for a number of weeks after labor to determine whether there is a laceration of the cervix.)

What are the complications?

- (1) Chronic pelvic cellulitis; (2) chronic endometritis (commonly fungoid); (3) chronic cervical catarrh, with erosions and cystic degeneration of the cervix, and sterility; (4) hypertrophy of the cervix or of the entire uterus; subinvolution; chronic metritis; (5) displacements of the uterus; (6) tendency to abortion.

What is the prognosis?

If untreated, a recent laceration may exceptionally cicatrize and the symptoms disappear; but, as a rule, the patients are invalids until radical treatment is resorted to. Cases operated upon, as a rule, are cured of all symptoms.

What is the treatment?

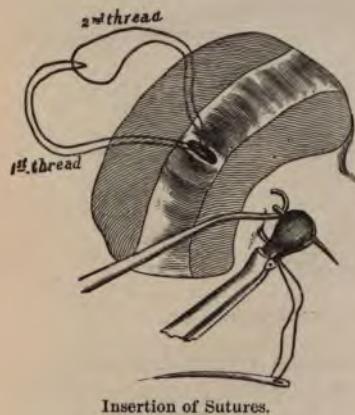
- (1) General; (2) preparatory; (3) operative.
- (1) *General Treatment*.—*a*, Remove pressure from above (skirts, corsets, etc.); *b*, a pessary is often indicated; *c*, tonics.
- (2) *Preparatory Treatment*.—To lessen local congestion and to cure catarrh, erosions, and cysts—*a*, emollient vaginal douches; *b*, scarification (once or twice weekly); *c*, puncture of cysts and touching their cavity with nitric or chromic acid; *d*, erosion of mucous membrane and alterative applications; in mild cases Churchill's tincture without the curetting; *e*, glycerin tampons; *f*, if the flaps are very large and very far apart, a single silver suture may be introduced one or two weeks before the operation.
- (3) *Operative Treatment*.—The results of operations performed *immediately after labor* are very unsatisfactory. If profuse hemor-

rhage occur from a laceration, it may be controlled by one or two silver sutures, but a formal operation had better not be attempted for a number of months.

Describe Emmet's operation for trachelorrhaphy.

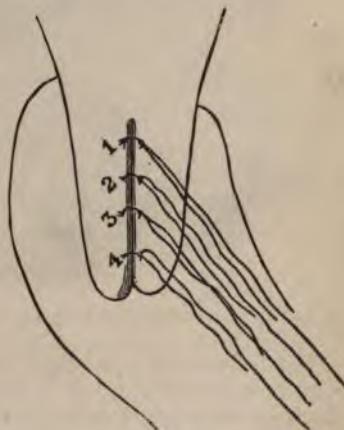
It is the best operation for the repair of a laceration of the cervix, and depends for its success upon asepsis and perfect apposition.

FIG. 67.



Insertion of Sutures.

FIG. 68.

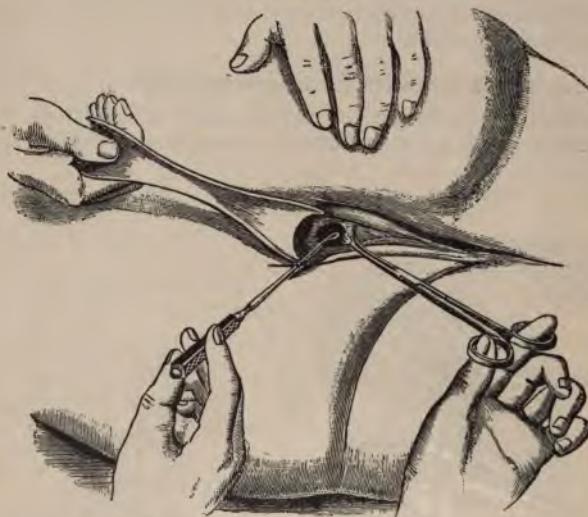


Sutures in Place.

tion of denuded surfaces, so that no point of granulation is left. It is usually, but not necessarily, done under anaesthesia. The bladder and rectum should be empty and the vagina disinfected. Three assistants are necessary, and the operation should never be done when there is cellulitis, as indicated by tenderness.

The patient is in Sims's position, and the uterus is drawn down by two silk sutures, one passed through each lip of the cervix. In denuding the flaps begin at the lower part of the lower right-hand flap, and cut parallel with its surface up to the angle. Then the upper right-hand flap is similarly pared. If a nodular mass ("cicatricial plug") can now be felt at the angle, it must be excised.

FIG. 69.



Position of Patient in Emmet's Trachelorrhaphy.

The left-hand flap is similarly treated. (Gynecologists use scissors, Emmet's curved, but it can be done with a scalpel.) Hemorrhage is controlled by pressure or by hot antiseptic irrigation.

In *suturing*, Emmet's short cervical needle, threaded with a loop

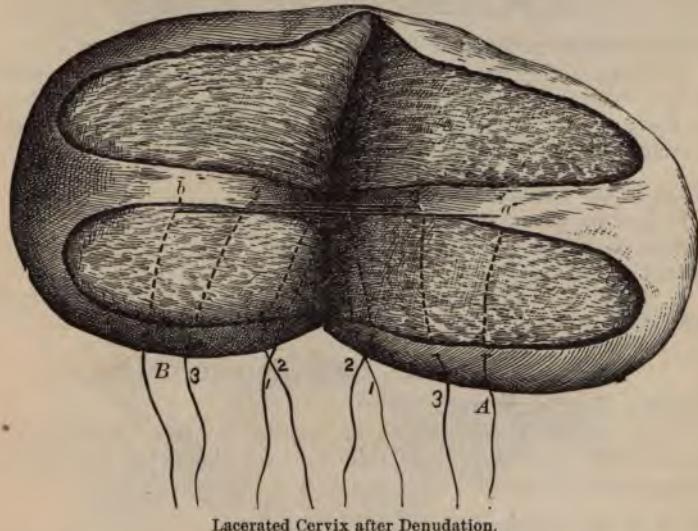
FIG. 70.



Area of Denudation in Trachelorrhaphy.

of silk to carry a silver suture eight or ten inches long, is used. Three or four sutures are introduced at each side, beginning close

FIG. 71.



to the angle, and they are tightened in the same order by means of a wire-twister and shield. The ends are bent flat against the cervix, and the vagina is lightly tamponed.

The patient is kept in bed two weeks (urination and defecation

FIG. 72.



Schultze's Dilator.

in the recumbent position). Antiseptic vaginal douches every two or three days. The sutures are removed on the ninth day, and in the order in which they were introduced.

NEOPLASMS OF THE UTERUS.

Describe their occurrence.

They are more frequent and more varied than in any other organ. This is due to the complexity of its structure. Congenital tumors of the uterus are almost unknown. It is doubtful also whether uterine tumors ever occur before puberty.

What is the classification?

I. Tumors arising from the parenchyma (*i. e.* muscular or connective tissue) of the uterus: fibromyoma (benign); sarcoma (malignant).

II. Tumors arising from the mucous membrane: mucous polypi (benign); carcinoma (malignant); adenoma (doubtful).

FIBROID TUMORS, OR FIBROMYOMATA.

Describe their occurrence.

They are the most common of uterine tumors. Half of all women over fifty have been said to have them, but this is an exaggeration (Tuttle).

What is the etiology?

Race.—African (nearly all who have any uterine trouble have them).

Age.—Thirty to forty (never before puberty, and never originate after the menopause).

(The influence of marriage and parturition is unknown. Sterility is a result, not a cause.)

What is the pathology?

They all consist of hypertrophic muscular fibres and of connective tissue, and hence are all called fibromyomata. In the great majority of cases the connective tissue is so much in excess that the tumor may be considered a fibroma.

Fibroma feels and cuts hard. The cut surface is white, and presents even to the naked eye bundles of connective tissue arranged about various centres. There is a distinct capsule of loose, highly vascular connective tissue. As to site, it is most frequent

in the body of the uterus (in its posterior or anterior wall, rarely at the sides).

Myoma is soft, red, and succulent; it consists chiefly of muscular fibres, and may be considered a local hypertrophy of the uterine wall. Microscopically the muscular fibres are seen to be enormously hypertrophied, as in the pregnant uterus. It is most commonly found near the fundus.

What are the varieties?

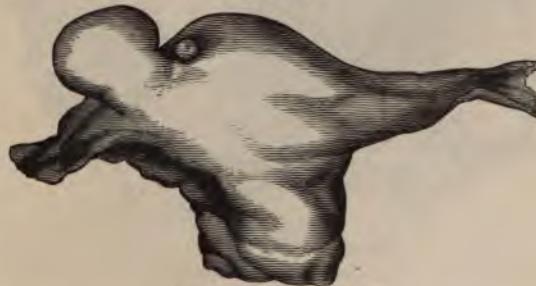
(1) Subserous or subperitoneal; (2) interstitial (intramural, intraparietal); (3) submucous.

extra mural
concentric

SUBSEROUS FIBROIDS.

These begin in the muscular wall near the outer surface, and grow in the direction of least resistance. The most common site

FIG. 73.



Subserous Fibroid of Uterus.

is the posterior wall, less common the anterior wall. They are usually multiple, but the others are apt to be interstitial or submucous. They may be simple or compound, and may have a long, narrow or a short, broad pedicle. A large fibroid with a thick pedicle may draw the uterus up, and even stretch it. They most often grow into Douglas's pouch and drag the uterus back. A fibroid, especially one with a long pedicle, may become incarcerated in Douglas's pouch. Adhesions may be excited by the movements of the tumor, and the tumor become attached to the bladder, rectum, or abdominal wall. The pedicle in some cases is so stretched as to give way, and the fibroid become an independent tumor. **W**

the vascular supply from the adhesions is sufficiently free, we may find the tumor increasing in size in its new situation.

INTERSTITIAL FIBROIDS.

These begin deeply in the muscular wall, and develop equally in all directions until finally a bulging of both external and internal

FIG. 74.



Interstitial Fibroid.

surfaces is produced. The tumor is surrounded by normal uterine tissue; it is usually multiple, may be simple or compound, most common near the fundus, and consists principally of muscular fibres.

SUBMUCOUS FIBROIDS.

Beginning in the layer of muscular tissue immediately beneath the mucous membrane and protruding into the uterine cavity, these have usually a broad, thick pedicle, but may have a long, thin pedicle, in which case they are called fibrous polypi.

What are the complications of fibroid tumors?

A. Changes in structure of the uterus: (1) The whole uterus

may be hypertrophied, its walls thickened, and its cavity increased in size and length. (This is often the case with submucous and interstitial fibroids.) (2) Chronic endometritis, with thickening

FIG. 75.



Submucous Fibroid.

of the mucous membrane and increase in the glands, except over the tumor, where the membrane is atrophic.

B. Changes in the position of the uterus: (1) Ascent—the uterus may be stretched until it measures six or eight inches. (2) Prolapse. (3) Inversion (can occur only with a submucous polypus with a short pedicle). (4) Retroflexion or anteflexion. (5) Incarceration of the uterus (by a tumor in Douglas's cul-de-sac, fixed by adhesions and continuing to increase in size).

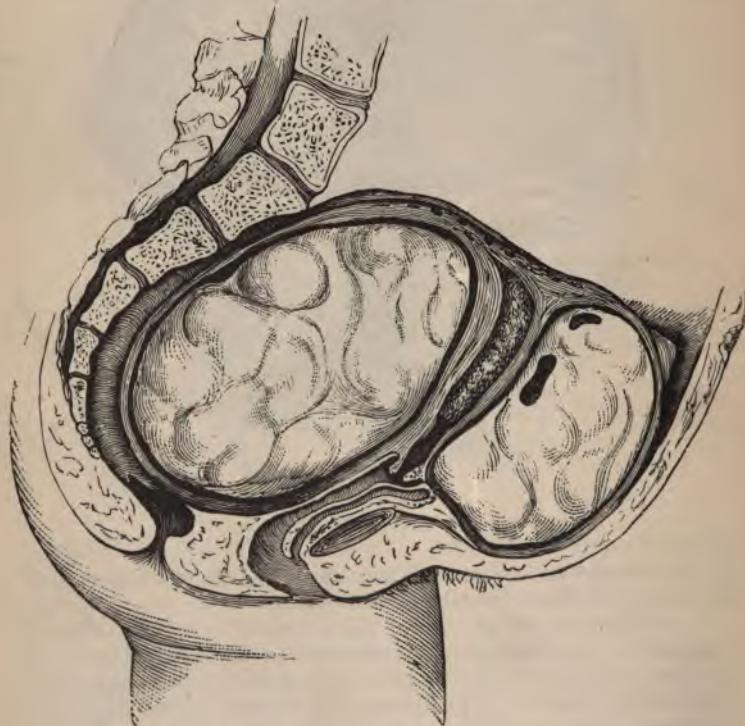
C. Degeneration in the tumor. (1) Softening. (2) Induration (as a rule, after the climacteric). (3) Calcification (occurs about the climacteric). (4) Suppuration and gangrene (usually the result

of violence in examination or treatment). (5) Sarcomatous degeneration is well proven to occur. (6) Carcinomatous degeneration probably never occurs.

What are the special features of fibroids of the cervix?

Subperitoneal Fibroids are the most important. They start be-

FIG. 76.



Fibroid Incarcerated in the Pelvis.

hind and to one side, and grow either (1) out behind the layers of the broad ligament, tending to fill up the pelvis; or (2) down-

ward into the connective tissue alongside the vagina. *Pathology*.—Almost exclusively connective tissue. They have a short, broad pedicle, and are rather fixed. *Dangers*.—They cannot rise out of the pelvis, and as they grow they become incarcerated and press upon nerve and other structures. It is sometimes impossible to remove them.

Submucous and Interstitial Fibroids give rise to distortion of the cervix, and are rather difficult to diagnose.

What are the symptoms of fibroid tumors?

- I. Hemorrhage;
- II. Pain;
- III. Sterility.

I. *Hemorrhage*.—At first there is menorrhagia, the duration of the menstrual flow increasing until it lasts three weeks out of every four. There is no sudden flooding, but an insidious loss of blood. The blood comes not from the tumor, nor from the thin atrophic mucous membrane over it, but from the rest of the mucous membrane. Later, there is added metrorrhagia. The mucous membrane over the tumor becomes ulcerated, and the vascular capsule of the tumor is exposed. From this there is irregular hemorrhage excited by any muscular effort or misstep, etc. There is always hemorrhage in the submucous, often in the interstitial, but not so commonly in the subserous, varieties.

II. *Pain*.—In submucous fibroids it is worst at menstruation from engorgement of the tumor, which also acts as a foreign body and produces the colicky pains of obstructive dysmenorrhœa.

In interstitial fibroids there may be colicky pain, but more often it is a tearing or stretching pain during menstruation, from the pressure of the engorged tumor upon the nerves of the uterus.

In subserous fibroids there is a sensation of dragging and weight, especially during menstruation. There are also attacks of peritonitic pain (with fever and tenderness, indicating local peritonitis).

III. *Sterility* may be the mechanical effect of a large tumor, or it may be due to the complication, chronic endometritis.

There may be Symptoms due to Pressure.

On the Urethra.—Partial or complete retention of urine.

On the Bladder.—Vesical irritability; sometimes residual urine and cystitis.

On the Ureters.—Partial obstruction or hydronephrosis and death.

On the Rectum.—Constipation or faecal obstruction.

On Nerves.—Sciatica, numbness of the limbs, pain in the joints.

On Vessels.—Haemorrhoids, varicosities of labia and legs.

What secondary symptoms are sometimes present?

Abortion; leucorrhœa (not a prominent symptom); ascites, rare (if present it throws doubt upon the diagnosis); symptoms of early pregnancy.

What are the physical signs of small fibroid tumors?

(1) In the case of a small fibroid of the cervix (which would have to be differentiated from inversion of the uterus) find the os externum, pass a sound, and by bimanual examination (under anaesthesia if necessary) determine the presence of the fundus of the uterus in its normal place.

(2) With a small pedunculated submucous fibroid dilate the cervix and introduce the finger.

(3) With a submucous fibroid with a broad base and high up in the fundus, bimanual examination shows the uterus to be enlarged. The sound may pass farther than the normal. Pass a finger into the anterior fornix, and judge of the amount of tissue between the finger and the sound, and also whether there is any localized hardness. The posterior wall of the uterus is examined in the same way.

What is the differential diagnosis of small fibroid tumors?

(1) Chronic metritis; (2) early pregnancy; (3) anteflexion; (4) retroflexion; (5) inversion (which see).

(1) Chronic metritis is characterized by uniform enlargement of the uterus, absence of a hard lump, sensitiveness.

(2) Early pregnancy: With fibroids the uterus is enlarged, but hard. In early pregnancy the uterus is enlarged, but soft and elastic, the os is velvety, and menstruation is arrested. (In case of doubt wait a month and note changes.)

(3) and (4) Flexions: A sound with the necessary curve and a finger in the fornix of the vagina show that the uterine wall is of normal thickness throughout. (In the case of a fibroid the uterine canal is straight, and there is a localized thickening and *induration* of the uterine wall.)

What are the physical signs of large fibroid tumors?

(1) *Palpation*.—*a*, Outline distinct, consistence hard; *b*, relation to uterus. An assistant pulls down the uterus with the volsella; you feel the tumor through the abdominal wall; *c*, position usually near median line.

(2) *Percussion*.—Usually flat, but may be dull-tympanitic if covered by intestines.

(3) *Auscultation*.—A souffle may be heard, most often over the sides, but sometimes over the entire surface of the tumor. It is only present when large vessels enter the tumor.

(4) *Vaginal Touch*.—(*a*) The cervix is hard; (*b*) the cervix is drawn up.

(5) *Bimanual Examination*.—Gives the impression of a mass belonging to the uterus.

(6) *Sound*.—Never use it unless you have excluded pregnancy, and remember that pregnancy and fibroids may coexist. (*a*) The uterine cavity is increased in length. This is most marked with submucous fibroids, where it may be over four inches long. (*b*) The uterine cavity may be tortuous and require several attempts before the sound is passed quite to the fundus.

What is the differential diagnosis of large fibroid tumors?

(1) From late pregnancy; (2) ovarian tumor; (3) extra-uterine pregnancy; (4) haematocele and inflammatory exudation.

(1) *From Late Pregnancy*.—Symptoms common to each are—1, abdominal enlargement; 2, enlargement and pigmentation of the breasts; 3, violet coloration of the vaginal mucous membrane; 4, uterine souffle; 5, morning vomiting.

The symptoms peculiar to pregnancy are—1, the foetal heart-sounds; 2, foetal movements; 3, ballottement; 4, rhythmic contraction of the uterus; 5, softening of the cervix; 6, arrest of menstruation.

(2) *From Ovarian Tumor*.—1, Ovarian tumors grow rapidly; fibroids slowly; 2, ovarian tumors begin at one side; uterine fibroids near the median line; 3, on palpation an ovarian tumor feels soft and doughy; fibroids hard and well defined; 4, with an ovarian tumor the uterus lies low down in front of or behind the tumor; with fibroids the uterus is drawn up; 5, an ovarian tumor does not move with the uterus; a fibroid does; 6, with an ovarian tumor neither the uterus nor its canal is enlarged; both are with fibroids; 7, with an ovarian tumor there is often irregular and

painful menstruation, but not the menorrhagia and metrorrhagia characteristic of fibroids.

(3) *From Extra-uterine Pregnancy*.—Common to both are—1, abdominal tumor; 2, enlargement and pigmentation of the breast; 3, morning vomiting; 4, uterine souffle; 5, violet coloration of vagina; 6, irregular and profuse menstruation; 7, attacks of peritoneal pain.

Peculiar to extra-uterine pregnancy.—1, rapid growth and lateral position of the tumor; 2, the uterus does not move with it; 3, shreds of membrane (characteristic under the microscope) are occasionally cast out of the uterine cavity.

(4) *From Hæmatocele or Inflammatory Exudation*.—The history is characteristic: sudden onset with fever, pain, and tenderness, and the tumor is at first soft and diffuse; later it contracts and becomes hard, but always remains tender.

What is the course?

(1) As a rule, the growth is arrested at the menopause. It may then become indurated or calcified, and sometimes reduced in size. The *cause* is the diminution in vascularity. (2) The same change may take place in younger women in whom from any cause the sexual functions cease.

How may spontaneous cure occur in fibroids?

(1) Expulsion by uterine contractions; (2) rupture of pedicle (if submucous or subserous); (3) spontaneous enucleation (the capsule ulcerates through, and the tumor is drawn out by uterine contractions); (4) suppuration and gangrene of the tumor itself, and discharge piecemeal (commonly by the vagina, rarely by rectum or bladder): this is very often associated with fatal septic intoxication.

What are the causes of death?

Hemorrhage, rarely; exhaustion from long-continued drain; peritonitis, rarely; septic peritonitis; rarely pressure on ureters, etc.

What is the prognosis?

Good. Recurrence never takes place; they are benign.

Describe the treatment.

It may be general, or local by electrolysis, surgical removal, removal of uterine appendages.

Describe the general treatment.

Give tonics and prevent incarceration. Keep the tumor out of

the pelvis, and if large apply an abdominal bandage to support it. Bromide of potash probably has no effect, and the same is true of iodide of potash, the salts of zinc, and arsenic and phosphorus (Tuttle). All of the above have been recommended at different times. Ergot acts in two ways: it causes contraction of the arterioles themselves, and causes contraction of the uterine muscular fibres, further narrowing the vessels and tending to expel the tumor. For administration Squibbs' ergotin is given hypodermically. Ten minimis of the following formula may be deeply injected in the abdominal wall, the thigh, or the buttock:

R. Ergotin (Squibbs'), $\frac{3}{10}$ ij;
Chloral hydrate, $\frac{3}{10}$ ss;
Aquaæ, q. s. ad $\frac{3}{10}$ j.—M.

The effect is visible after fifty or one hundred injections, and the best cases are interstitial fibroids, which may be positively cured. It is useless in submucous or subserous fibroids.

Describe the local treatment by electrolysis.

This method of treatment was proposed by Apostoli of Paris, but has not yet been generally adopted. The best battery is one in which the elements are about thirty plates of copper and zinc, 6 by 9 inches, in a solution of chromate of potash. Insulated conducting wires and silver intra-uterine probes, with a groove to ensure the patency of the os, and a broad sponge electrode for the surface of the abdomen, are the apparatus required. No anæsthetic is needed. The current of 50 to 150 milliampères should be allowed to flow for three to fifteen minutes, according to symptoms. Galvano-puncture if the tumor is felt in Douglas' pouch. The after-treatment is rest in bed and morphine if required. The results claimed for it are—50 per cent. arrested; 40 per cent. benefited; 8 per cent. not benefited; 2 per cent. deaths.

The dangers of this method of treatment are—puncturing the intestines; exciting suppuration and gangrene in the tumor, with the risk of septic peritonitis, etc.; hemorrhage and collapse.

Describe the local treatment by surgical removal.

I. *Removal by the Vagina* (submucous or interstitial fibroids).—
(1) Dilate the cervix (after making two superficial lateral incisions) until it is large enough to permit the extrusion of the tumor. (2) Make a cruciate incision 1 inch long and $\frac{1}{4}$ inch deep over the most

dependent portion of the tumor. (3) Give ergot systematically, and finally, as a rule, the tumor will be expelled spontaneously. (4) If necessary enucleate the tumor at once with a spoon-saw and volsella, finally cutting the pedicle with the scissors. The operation should be done under ether and all antiseptic precautions observed.

II. Removal by Abdominal Section.—The mortality is very great all over the world (50 per cent., which is very much greater than that of ovariotomy), but in the hands of some operators it is small (8 per cent.).

Steps of the Operation.—(1) Anæsthesia and usual antisepsis; incision four or five inches long in the median line. (2) Bringing the tumor out through the incision. (3) Treatment of the stump: (a) intraperitoneal method; (b) extraperitoneal method.

(a) *Intraperitoneal Method.*—This is applicable, first, to tumors with small pedicles, which are simply ligated, dropped back into the abdominal cavity, and the abdominal wound accurately sutured throughout. (The results are very good indeed, but these are tumors which do not ordinarily require operation. Indications for operating upon such a tumor would be—1, hemorrhage uncontrollable in any other way, and where we cannot remove the appendages; 2, continuance of growth in the tumor after the menopause; 3, extreme size of tumor rendering life a burden; 4, rarely recurrent ascites.)

The intraperitoneal method is applicable, second, to tumors with short, broad bases, and is as follows: An elastic ligature is passed around the uterus at the level of the os internum; the tumor is removed by a V-shaped incision into the substance of the uterus; this incision is closed by muscular and peritoneal sutures (none passing through the mucous membrane); the uterus is dropped back into the pelvis, and the abdominal wound accurately closed. (The dangers of this method are—1, hemorrhage; 2, peritonitis; 3, septic infection from opening the intra-uterine canal. If this has been opened, it must be accurately closed by suture, first of the mucous membrane, then of the muscular wall, and then of the peritoneum.) The results are less satisfactory than those of the extraperitoneal method.

Schroeder's Modification of the Intraperitoneal Method consists in passing a double ligature through the cervix, tying off the appendages, cutting away the uterus, and suturing the peritoneum over the stump. The stump is left free in the peritoneal cavity.

The abdominal wound is sutured. The vagina and uterine canal are disinfected before operation, and drainage is provided after operation by a strip of iodoform gauze passing into the uterine canal from the vagina.

(b) *Extraperitoneal Methods*.—1, Ligation and transfixion; 2, clamp and cautery (Thomas); 3, serre-nœud; 4, elastic ligature.

1. *Ligation and Transfixion*.—Pedicle is ligated; two skewers are passed through it and brought out on the abdominal surface. The tumor is cut off beyond the ligature. The abdominal wound is closed above and below the pedicle. Antiseptic dressing changed frequently.

2. *Clamp and Cautery* (Thomas).—Clamp applied and screwed down. Two skewers passed through the pedicle as above. Tumor cut away. Stump thoroughly cauterized. Clamp loosened, but left in place. Suture of wound above and below. Antiseptic dressing.

3. *Serre-Nœud*.—The pedicle is transfixed by a double wire ligature. Each loop is twisted tight in a "serre-nœud." The pedicle is cauterized and secured in the wound. Sutures and antiseptic dressing.

4. *Elastic Ligature* (Hegar's).—Elastic ligature, 5 mm. in diameter. Cauterization of the stump (a strong solution of chloride of zinc may be used). Closure of peritoneum around the stump separately. Suture and antiseptic dressing.

Describe the local treatment of large subserous fibroids by removal of uterine appendages.

Tait's Operation.—Removal of ovaries and tubes may be performed to check the growth of a large fibroid.

Battey's Operation.—Removal of the ovaries alone. This does not have the desired effect.

FIBRO-CYSTIC TUMOR OF THE UTERUS.

What is the pathology?

It is originally a fibroid which undergoes softening, and in which spaces have formed and become filled with serous fluid. Sometimes these spaces have an endothelial lining, and in a few cases the contents become gelatinous and fibro-myxoma is produced.

What are the symptoms?

Rapid growth; not much menstrual disturbance; tumor feels soft in some places; hard in others, and moves with the uterus.

What is the differential diagnosis ?

From ovarian cyst it is made by the presence of the fibrous hardness of portions of the tumor and by its relation to the uterus.

What is the treatment ?

The same as for fibroids.

UTERINE POLYPUS.**What are the two kinds ?**

Fibrous polypus ; mucous polypus.

Fibrous Polypus.—This is a pedunculated submucous fibroid.

Mucous Polypus.—This is a pedunculated tumor attached to the mucous membrane (most commonly of the body) of the uterus. The tumors are usually multiple, and vary in size from that of a pea to that of a lima bean. They are soft and pulpy, and are not round or pyriform, but flattened. They are very vascular.

What is the pathology of mucous polypi ?

The glands are the same as in the normal mucous membrane ; there is a large amount of connective tissue, and immense vascular supply. Other polypi are formed from retention cysts, occluded cervical glands which have become pedunculated, and from bits of retained placenta or from placentaæ succenturiataæ (placental polypi).

What are the symptoms of uterine polypi ?

(1) Hemorrhage ; (2) discharge ; (3) pain ; (4) sterility ; (5) symptoms due to pressure and weight.

(1) *Hemorrhage.*—In fibrous polypus hemorrhage is from the mucous membrane of the body of the uterus, and, as a rule, is checked when the polypus is pushed into the vagina by uterine contraction. Sometimes the capsule ulcerates, and there is irregular hemorrhage from the tumor itself. In mucous polypus the hemorrhage is from the tumor itself, and one no larger than a finger-tip may cause death. In polypi formed from retention cysts there is no special hemorrhage.

In placental polypus hemorrhage is from the tumor itself, and irregular and profuse.

(2) *Discharge.*—With fibrous polypus there is little discharge until the tumor enters the cervix or vagina, when leucorrhœa is excited. With the different varieties of mucous polypi leucorrhœa is a regular symptom.

(3) *Pain.*—Dysmenorrhœa is always present with fibrous and

placental polypi as long as they remain in the uterine cavity, and especially when they are near the os internum. With mucous polypi and those from retention cysts there is usually no pain unless they produce obstructive dysmenorrhœa.

(4) *Sterility*.—The polypus may act as a mechanical obstacle to the entrance of spermatozoa or to the entrance of the ovum from the tube.

(5) *Pressure*.—If the polypus is very large, there may be vesical and rectal symptoms.

In rare cases there are present the symptoms of early pregnancy—morning sickness, enlargement and pigmentation of the breasts, etc.

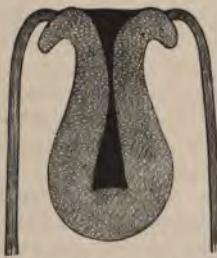
What are the physical signs of uterine polypi ?

Digital Examination.—Fibrous polypus is larger than a walnut, firm, and its attachment is high up; mucous polypus is small, slippery, and its pedicle may be caught in the cervix.

FIG. 77.



FIG. 78.



Bimanual.—In fibrous polypus the uterus is enlarged; in mucous polypus it is not.

Sound.—In fibrous polypus the uterine cavity is lengthened; in mucous polypus the uterine cavity is not lengthened.

Speculum.—Fibrous polypus, pale or perhaps ulcerated; mucous polypus, bright red and either smooth or like a raspberry.

(When the os is closed, to determine the cause of the hemorrhage: it is pretty certainly a fibroid polypus if the uterus is enlarged and its cavity lengthened. But if the uterus is not enlarged, then it is necessary, to complete the diagnosis, to dilate the os and introduce the finger or a cervical speculum.)

Placental polypi are diagnosed by microscopical examination (club-shaped tufts).

What is the differential diagnosis of fibrous polypus from complete inversion of the uterus?

(1) Pass the finger into the vagina and see whether the mucous membrane is everywhere reflected on to the tumor. If there is an opening into which the sound may be passed, the tumor is a polypus.

(2) By bimanual examination under anaesthesia the fundus of the uterus is felt in the normal position; similarly recto-abdominal examination.

(3) Abdominal palpation is sufficient in a few cases.

What is the prognosis of uterine polypi?

Good if removed.

What is the treatment of uterine polypi?

Removal.—Anaesthesia should generally be employed; antiseptic precautions; the cervix is thoroughly dilated. A small mucous polypus may be seized by serrated forceps and twisted off, or it may be snipped off with scissors. Pedunculated cysts are simply snipped off. With a fibrous polypus, find where the pedicle is attached, and if this is thin seize the tumor with forceps and twist it off. If the pedicle is too thick, draw the tumor down gently and cut through the pedicle with scissors. If hemorrhage is likely to be excessive, the pedicle may be cut through with the écraseur or the galvano-cautery, or ligated previous to cutting.

Where you cannot get at the pedicle the tumor may be torn away piecemeal, or it may be removed by Thomas's method: seize the tumor at its lowest part and excise it by a V-shaped incision. Hemorrhage may require the use of the cautery and packing the uterine canal with iodoform gauze.

CARCINOMA OF THE UTERUS.

As 98 per cent. of all cases are of the cervix, it is necessary to describe in detail only

Carcinoma of the Cervix.**What is its etiology?**

Predisposing Causes.—Race: Irish and German, Americans less frequently, and negroes rarely; sexual excesses; multiparæ (usually have had about five children). Age: forty to fifty most common; thirty to sixty are the usual limits; heredity is not marked. Bad hygiene: it is much more common in the poor.

Exciting Causes.—Laceration of the cervix; chronic cervical catarrh with erosions.

What is its pathology?

The tumor consists of connective tissue enclosing alveoli which are filled by atypically arranged epithelial cells. When the connective tissue is greatly in excess, the tumor is said to be scirrhous, fibrous, or "hard" cancer. When the cells are greatly in excess, the tumor is a medullary, encephaloid, acute, or "soft" cancer.

What are the clinical varieties?

(1) Squamous epithelioma or cancrroid is the most common form. It begins on the vaginal aspect of the cervix (where the epithelium is squamous) and spreads to the vaginal wall, but not to the cervical canal until quite late. The cellular elements are abundant, and often produce large "cauliflower masses." It may involve one or both lips of the cervix. Its growth is rapid, the connective tissue at the side of the cervix is soon infected, and finally carcinomatous nodules appear in the substance of the cervix.

(2) This form begins as small cancerous nodules in the substance of the cervix. These ulcerate their way through to the vaginal aspect or to the cervical canal. The growth is up into the body of the uterus and into the pelvic connective tissue.

(3) This form occurs rather later in life. It begins as an ulceration of the cervical endometrium, and extends up into the cavity of the uterus, leaving the external os intact for a long time.

(In the later stage all these forms merge into each other.)

How does cancer spread?

1. By direct extension into adjacent tissues.
2. By infection through the lymphatic system.
3. By infection through the

blood-vessels (rare, but very rapid). 4. Rarely by auto-inoculation from contact of the cancerous cervix with the vaginal wall.

1. *Direct Extension*.—To the vaginal walls; to the body of the uterus; to the pelvic connective tissue; to the peritoneum, preceded by local peritonitis with exudation; to the ureters (they are almost always affected in advanced cases, and finally hydronephrosis is produced); to the bladder (the muscular coat is at first involved, later the mucous membrane, which ulcerates and results in fistula); to the rectum rarely. In extreme cases the entire pelvic contents are glued together in an indistinguishable mass.

2 and 3. *Secondary Infection*.—To the inguinal, retroperitoneal, and lumbar lymphatic glands; ovary; liver; lungs; mammary glands, rarely.

What are the symptoms of carcinoma of the cervix?

Hemorrhage, discharge, pain, cachexia.

Hemorrhage begins as a sudden flooding (not as profuse menstruation); it comes from the vascular stroma of the tumor. It is not very profuse, and is rarely fatal. It occurs after coitus or after some muscular effort.

Discharge is not abundant until ulceration occurs. It can only be characterized as "concentrated rottenness." In the early stages it is light-yellow and watery. Later it is mixed with more or less blood, and may be a bright-red or a dirty chocolate color.

Pain.—There is not much until the disease extends beyond the cervix; then there is a dull, gnawing, deep-seated pain. There may be shooting pains. Abdominal pain (late stages from local peritonitis), pain in the breasts, and neuralgicæ also occur.

Cachexia.—There are anorexia, indigestion, emaciation, urinary and rectal symptoms, intense vaginitis and vulvitis from contact with the discharge. The skin is of a characteristic dull, dingy color.

What are the physical signs?

1. *Digital Examination*.—Large epithelioma: the lip is inverted, and a friable cauliflower mass is felt which bleeds readily; characteristic odor. Small epithelioma: there is slight irregularity of the surface, hemorrhage, and odor. Nodular carcinoma: the finger recognizes a nodular growth in one lip of the cervix. Carcinoma originating in the cervical canal: hemorrhage and offensive discharge.

2. *Bimanual and Rectal Examinations* should be made to determine the extent of involvement of neighboring tissues.

3. *Speculum*.—As a rule unnecessary. The growth is pale yellow, with little white kernels, and has a sharply-defined border.

4. *Sound*.—Unnecessary.

What is the differential diagnosis?

(1) From simple hypertrophy of the cervix (in this the cervix is hard, the woman young, and there is no cachexia); (2) from papillary erosions (these may develop into carcinoma, and the microscope must be used to make a differential diagnosis); (3) from sloughing fibroid; (4) from sarcoma; (5) from diphtheritic or syphilitic ulceration.

What is the prognosis?

Spontaneous cure probably never occurs. Duration of life is from one to two years. The most rapid cases are those of encephaloid carcinoma.

What is the treatment?

General.—Build up the general health, forbid coitus.

Local.—(1) Palliative. (2) Curative (surgical removal).

(1) *Palliative Treatment*.—For *hemorrhage* injections of cool solutions of alum or tannin. Sometimes it is desirable to use the sharp spoon. It is not desirable to tampon the vagina.

For the *discharge*, if not offensive, astringent injections of alum or tannin; if offensive, add permanganate of potash or some other deodorizer.

(2) *Curative Treatment*.—*a*, Removal by caustics; *b*, removal by curette and cautery; *c*, amputation of cervix; *d*, removal of uterus entire.

a. Removal by Caustics: Nitric acid, bromine dissolved in alcohol. (Cylindrical speculum, caustic applied on a cotton swab.) Not a valuable or desirable method.

b. Removal by Curette and Cautery: Cut away the mass of the disease with scissors, and then with Sims's sharp curette scrape away all diseased tissue. The vagina is protected by a large tubular speculum while the entire raw surface is touched with the Paquelin cautery. A tampon of iodoform gauze is introduced, and is to be changed in two or three days.

c. Amputation of the Cervix: The different methods are—1, circular amputation with the knife; 2, circular amputation with the écraseur or galvano-cautery (both of these are undesirable because followed by cicatricial stenosis); 3, Schroeder's amputation.

d. Removal of uterus entire: 1, Abdominal hysterectomy; 2, vaginal hysterectomy.

Describe abdominal hysterectomy.

Ether and careful antisepsis. The patient lies upon her back on a flat table or upon Trendelenberg's table (by which the pelvis is raised about nine inches higher than the shoulders, thus causing the intestines to gravitate toward the diaphragm, and giving better access to the pelvic viscera). An incision is made in the linea alba between the umbilicus and the pubes, and hemorrhage is checked before the peritoneal cavity is entered. The broad ligament on each side is tied off in sections and divided close to the uterus; care is taken to secure the uterine artery before it is divided. The fornices of the vagina are cut through all around and the uterus removed. The ureters must be avoided during the operation. The vagina may be partially closed by sutures and packing introduced. The abdominal wound may be sutured throughout or a drainage-tube (to be removed in twenty-four to forty-eight hours) may be inserted at its lower angle. An antiseptic absorbent dressing is applied.

(This has been almost abandoned as an operation for carcinoma of the uterus.)

Describe vaginal hysterectomy.

Ether and the usual antiseptic precautions. The patient is in the lithotomy position, and the vagina opened by two blunt retractors. The cervix is seized by bullet forceps and brought down close to the vulva. The posterior fornix of the vagina is cut through with scissors or a scalpel. Clamps are applied at each side of the uterus, and each broad ligament is ligated in sections. The fundus of the uterus is seized with bullet forceps and drawn down through the incision in the posterior fornix, and the organ is then excised. (The removal may be done equally well by an incision in the anterior fornix. The fundus of the vagina may be partially closed by sutures and the vagina packed with iodoform gauze.

(This is the best form of hysterectomy for carcinoma. It is contraindicated where the uterus is not freely movable and in cases in

which extension of the disease to the pelvic connective tissue has taken place.)

ADENOMA OF THE UTERUS.

Describe adenoma of the uterus.

It is a disease consisting in a hyperplasia of the glandular elements of the endometrium, forming a flattened friable mass at some part of the uterine cavity. The *symptoms* produced are similar to those of early carcinoma, hemorrhage being the most prominent. *Treatment* is dilatation, thorough removal of growth with a spoon saw, and touching the raw surface with fuming nitric acid. The growth has a marked tendency to recur, and each recurrence should be dealt with as above. The ultimate *prognosis* of cases under treatment is good. There seems to be evidence that neglected cases may become malignant from development of sarcomatous or carcinomatous elements. The *diagnosis* is made by the microscope.

SARCOMA OF THE UTERUS.

Describe sarcoma of the uterus.

The tumor consists essentially of a mass of connective-tissue cells; either small round cells or spindle-shaped cells, not occupying distinct alveoli, as do the cells in carcinoma. It begins either as a growth having the gross appearance of a submucous fibroid or as a diffuse infiltration of the uterus. The early *symptoms* are commonly those of a submucous fibroid. Later symptoms are like those of carcinoma: the surface ulcerates; there are irregular hemorrhage, offensive discharge, and the escape of sloughy shreds of the tumor. The *diagnosis* is made by the microscope. The *prognosis* is bad: untreated it is fatal in two to five or six years. It tends to recur if removed, but early hysterectomy offers a better chance of non-recurrence than in the case of carcinoma. *Treatment* is the same as for carcinoma. Hysterectomy is usually indicated. Ergot has been employed, as for a submucous fibroid, to expel the tumor by uterine contraction, but this is never more than palliative.

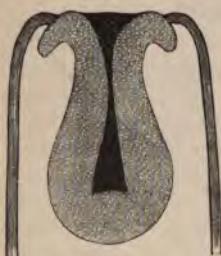
INVERSION OF THE UTERUS.

What are its definition and occurrence?

It is a condition in which the uterus is either partially or completely turned inside out.

In *partial inversion* some part of the uterine wall (commonly the region of one of the tubes) is inverted into the uterine cavity; this is marked on the external surface of the uterus by a ring encircling a deep depression, and on the internal surface by a rounded mass exactly similar to a submucous fibroid.

FIG. 79.

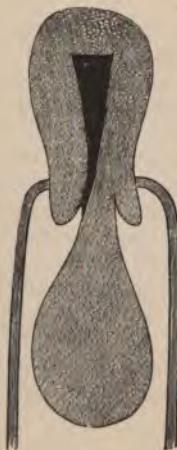


Complete Inversion.

In *complete inversion* the fundus is forced through the external os, and the uterus lies in the vagina or protrudes from the vulva as a pyriform mass covered by endometrium.

There is good authority for the statement that it can occur in the nulliparous uterus, but this is very rare indeed. It occurs commonly in uteri relaxed by recent parturition, and is commonly acute—*i. e.* of sudden production—although a

FIG. 80.



Polypus.

FIG. 81.



Partial Inversion.

chronic form is also described in which the inversion takes place *gradually*.

What is its etiology?

Predisposing Causes—Parturition; distension of the uterus by retained fluids; distension of the uterus by tumors.

Exciting Causes.—Traction on the placenta; traction by polypi or tumors; sudden delivery of child by traction; muscular efforts when relaxation exists.

What are its symptoms?

On its first occurrence, shortly after labor, there are pain, faintness, hemorrhage, and the presence of a large flabby mass (perhaps with the placenta attached to it) protruding from the vulva.

Cases which have existed for months or years present the following: occasional or constant hemorrhage; dragging pains in back and loins; difficulty in locomotion; difficulty in micturition and defecation; anæmia, etc.

What is the differential diagnosis?

It is based upon the physical signs:

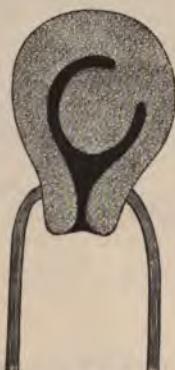
<i>Polypus.</i>	<i>Complete Inversion.</i>
Probe will usually pass beyond it into the uterus.	Probe is arrested.
Bimanual examination will reveal the body of the uterus <i>in situ</i> .	Bimanual examination reveals a ring where the uterus should be.
Rectal examination gives the same positive evidence.	Rectal examination is negative.
Recto-vesical, the same.	Recto-vesical, negative.
Acupuncture is painless.	Acupuncture is painful.

<i>Submucous Fibroid.</i>	<i>Partial Inversion.</i>
Probe shows uterine cavity lengthened.	Probe shows cavity diminished.
Bimanual examination and Simon's method (with hand in rectum) show the body of the uterus to have its normal roundness.	Bimanual and Simon's methods both show a small circular depression on the surface of the uterus.
Gradual development.	Sudden development.
Independent of parturition.	Usually follows parturition.
Acupuncture painless.	Acupuncture painful.

What is the prognosis?

Inversion occurring after labor is a grave accident, and may be followed by death from hemorrhage. If untreated, it will com-

FIG. 82.



Fibrous Polypus.

FIG. 83.



Partial Inversion.

monly persist permanently, though there are cases on record of spontaneous recovery even years afterward. The mechanism by which this takes place is obscure. The dangers in old cases are connected chiefly with improper diagnosis and treatment. Thus, it may be mistaken for a fibrous polypus, and an operation for this supposed trouble may result in amputation of the uterus; or in efforts at replacement rupture of the vagina may be produced. The lesion in itself presents in general the dangers of the worst form of fibrous polypus.

What is the treatment?

Palliative: Control of hemorrhage by the use of astringent solutions (alum, tannin, persulphate of iron, or acetate of lead).

Curative: *Reposition*; as a last resort, *amputation*.

Methods by Reposition.

Gradual reduction. { Elastic pressure by vaginal stems and cup or bulb.
Elastic pressure by vaginal water-bag combined with occasional taxis.

Gradual reduction.	$\left\{ \begin{array}{l} \text{Elastic pressure by vaginal water-bags alone.} \\ \text{A stream of cold water directed through a tubular} \\ \text{speculum twice a day.} \end{array} \right.$
Rapid reduction.	$\left\{ \begin{array}{l} \text{Viradel's method.} \\ \text{Emmet's "} \\ \text{Parrier's "} \\ \text{Noeggerath's "} \\ \text{Court's "} \\ \text{Thomas's "} \\ \text{White's "} \\ \text{Tate's "} \end{array} \right.$

All these rapid methods of replacement require anaesthesia, and should not be resorted to (under ordinary circumstances) until the milder methods of gradual replacement have been fairly tried and have failed. They all consist in pressure upon the fundus and counter-pressure upon the cervical ring. For example, Court's method consists in passing the index and middle fingers up the rectum and dipping them into the cervical ring while pressure is made upon the fundus by the thumb and by the other hand. This method is especially useful in effecting the re-inversion of the cervix. Noeggerath's method consists in placing the index finger on one horn, the thumb on the other, and so compressing as to invert one or both cornua. It is highly effective, but only after re-inversion of the cervix by Court's or some similar method. Thomas's method is the only one in which the abdomen is opened. Through a suprapubic incision the cervical ring is dilated by an instrument like a glove-stretcher while pressure is made upon the fundus from below.

Amputation of the Uterus.

This operation is resorted to in cases in which all attempts at reduction have failed, and in which the symptoms (chief of which is hemorrhage) are sufficient to justify so grave a step.

Its dangers are—(1) If hernia of the abdominal or pelvic viscera have taken place into the inverted sac; (2) it frequently produces emansio-menstruum with its sequelæ; (3) it produces sterility; (4) the mortality is very great: 33 per cent. of all recorded cases were fatal.

Methods.

1. Elastic ligature, retightened on the second day, the uterus

coming away about the fourteenth day. (This is the safest method.)

2. Knife or écraseur.
3. Knife or écraseur preceded by ligature.

DISEASES OF THE OVARIES.

ANATOMY OF THE FALLOPIAN TUBES AND OVARIES.

Describe the Fallopian tubes.

The Fallopian tubes are two tubes, from 4 to 6 inches in length, which spring from the upper angles of the uterus and run tortuously outward in the free margin of the broad ligaments. Each is divided into three portions—the isthmus, ampulla, and fimbriated extremity. The isthmus is the smaller straight portion. It is 1 inch long, and will just admit a bristle into its lumen. The ampulla is the larger external portion, which extends first outward, then forward and downward. It is 6 to 8 mm. in diameter. The fimbriated extremity, or “infundibulum,” is the funnel-shaped expansion, surrounded by numerous little fleshy processes or fimbriæ. There are four to five large primary and ten to twelve small secondary fimbriæ. One of the long primary fimbriæ on the inner side runs to the ovary, and is called the “fimbria ovarica.”

The tubes are composed of three coats—serous, muscular, and mucous membrane. The muscular coat is arranged in two layers, an external longitudinal and an internal circular set of fibres. The mucous membrane is thrown into numerous folds, and is covered by a layer of ciliated columnar epithelium, which becomes continuous with the peritoneal epithelium at the free end of the tube. The cilia move toward the uterus. There is no submucous layer, and the mucous membrane contains no glands.

The arterial supply is derived from the ovarian artery and the ovarian plexus. The veins enter the pampiniform plexus. The nerve-supply is derived from the inferior hypogastric plexuses. The lymphatics unite with those of the ovary.

Describe the parovarium.

The parovarium, or organ of Rosenmüller (analogue of the epididymis in the male), is a rudimentary structure, the remains of the Wolffian body. It consists of a triangular group of small tubules situated between the folds of the mesosplinx. These tubules converge to the ovary and are lined with epithelium.

They are united above by one transverse tubule, which has its blind extremity near the fimbriated end of the Fallopian tube. In the other direction it can be traced as a cord nearly to the uterus, and is known as the persistent duct of Grtner. Cystic dilatations are sometimes seen in these ducts, and may appear in the anterior vaginal wall. The most common form of these cysts is known as the "hydatids of Morgagni," which spring from the mesosalpinx to the inner side of the fimbria ovarica. The parovarium is thus of considerable importance, from its tendency to form cysts of the broad ligaments.

Describe the ovaries.

The ovaries are two small oval bodies situated one on either side of the uterus, and about 1 inch from it, projecting in the posterior layer of the broad ligaments. Each ovary is about the size of an almond, 1-2 inches long, $\frac{1}{2}$ -1 inch in width, and $\frac{1}{2}$ - $\frac{1}{3}$ inch in thickness. Their weight is from 60 to 135 grains. They present for examination an anterior and posterior border, an upper and lower surface, and an outer and inner extremity. The anterior border, called the hilus, is flattened and attached to the anterior layer of the broad ligaments. The blood-vessels and nerves enter here. The posterior border is rounded and free. The upper surface is more convex than the lower. The outer extremity is bulbous; the inner is more attenuated, and is connected to the uterus by the *ovarian ligament*.

The ovarian ligaments are fibro-muscular bands of the broad ligament, one inch long, which spring from the uterus just below the Fallopian tubes. The other ovarian ligaments are the infundibulopelvic, which is the outer free margin of the broad ligament, not containing the Fallopian tube, and the fimbria ovarica, which connects the ovary to the infundibulum. The external covering of the ovary is composed of a layer of short columnar epithelium called "germinal epithelium," because from their cells the primitive ova are supposed to spring. Its union with the squamous peritoneal epithelium at the hilus is marked by a "white line." Ingrowths of this germinal epithelium in the stroma are called the "tubes of Pflger." The epithelial layer rests directly upon a thin layer of dense fibrous tissue called the "tunica albuginea." The parenchyma of the ovary is composed of a cortical and medullary portion. The cortex or superficial portion is less vascular than the medullary. It consists of a network of connective tissue, elastic

and muscular fibres, imbedded in which are numbers of Graafian vesicles, blood-vessels, nerves, and lymphatics. The medullary layer is composed of the same elements as the cortex, but is less dense and more vascular.

The Graafian vesicles, or ovisacs, are formed from the tubes of Pflüger (ingrowths of the germinal epithelium). They vary in size when mature from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch in diameter. From 40,000 to 70,000 Graafian follicles are contained in the ovary at birth. Each follicle consists of an *external* covering, the *tunica fibrosa*, which contains the network of blood-vessels, and the *membrana propria*, on which rests a layer of nucleated columnar epithelium, the *membrana granulosa*. Inside this the vesicle is filled with a clear fluid, the "*liquor folliculi*." At one portion the *membrana granulosa* surrounds the ovum and forms the *discus proligerus*. The ovum itself, $\frac{1}{60}$ inch in diameter, is composed of an *external envelope*, the *vitelline membrane* or *zona pellucida*, within which is the *vitellus* or *yolk*. At one side of this is the *germinal vesicle*, which contains the *germinal spot*.

The *arterial* supply of the ovary is derived from the ovarian artery, which arises directly from the aorta. From its origin it bends inward and runs tortuously between the folds of the broad ligament to the upper angle of the uterus. Here it divides into two branches, one going to the fundus and anastomosing with its fellow, the other descending to unite with the uterine. It gives branches to the infundibulum, and numerous tortuous branches to the ovary, which enter the hilus and form plexuses about the Graafian follicles. The veins leave the hilus and unite with the uterine plexus and veins from the tubes to form the *pampiniform plexus*. They terminate in the ovarian veins, the right emptying into the vena cava direct, and the left into the renal vein.

The nerves are derived from the ovarian plexus and accompany the arteries. The lymphatics enter the lumbar glands.

MALFORMATIONS OF THE OVARY.

Describe malformations of the ovary.

Absence of the ovaries is very rare: it is associated with rudimentary development of the rest of the genital system. The patient may retain throughout life the development, physical and mental, of a child, or in rare instances may present the stature, beard, and mental characteristics of the male sex. In any case menstruation

never occurs, and the woman is sterile and sexual feeling is absent. *Diagnosis* is made from the symptoms and from the mal-development of the other sexual organs. *Treatment* is without benefit, and may do harm in breaking down the health by persistent efforts to excite the functions of the ovaries (under a mistaken diagnosis).

Imperfect and Irregular Development of the Ovaries.—A woman with imperfectly developed ovaries may present similar general symptoms to one in whom the ovaries are absent. The local *symptoms* are irregular or scanty menstruation, often sterility. *Treatment* is directed toward stimulation of the generative functions, as by general tonics, uterine irritation (tents or stems), electricity, marriage.

The cases of irregular development of the ovaries, including supernumerary ovary, would present no special interest, except to the pathologist, but for the fact that they may account for some cases in which removal of the ovaries is followed by menstruation or even conception.

ATROPHY OF THE OVARIES.

Describe atrophy of the ovaries.

The premature development of the senile condition in the ovaries is accompanied by similar changes in the rest of the generative system, and by the cessation of menstruation and the other sexual functions. The ovary may weigh 15 grains, the normal weight being 100 grains.

What are the causes?

Ovaritis, acute or chronic; pelvic peritonitis; the exanthemata.

What is the treatment?

Stimulation of the sexual functions, as for imperfect development of the ovaries.

What is the prognosis?

The condition is not dangerous to life, but if all signs of menstruation are absent the prospect of cure is poor.

DISPLACEMENTS OF THE OVARY.

Name the two displacements of the ovary.

Prolapse and hernia.

Describe prolapse of the ovary.

One or both of the ovaries may be displaced into Douglas's pouch.

What are the causes?

Retroversion or retroflexion of the uterus; enlargement of the ovaries from congestion; chronic ovaritis, or diffuse cystic degeneration.

What are the symptoms?

Dyspareunia; pain on defecation when the bladder is distended; sacral pain, and pain in the ischio-rectal fossa and hip extending down the thigh on the corresponding side.

What are the physical signs?

On digital examination one or two bodies the size and shape of the ovaries can be readily felt in Douglas's pouch, movable independently of the uterus, and producing on pressure a sickening sensation analogous to that from pressure on the testicle.

What is the treatment?

(1) Reposition by the knee-chest position (maintained fifteen minutes at a time twice daily). (2) Use of a pessary (the best for most cases is a soft-rubber ring). (3) Palliative treatment (forbid coitus; prevent the formation of hard scybala in the rectum; remove pressure from above by an abdominal belt; if conception is probable, encourage it in the belief that the nine months' rest from functional activity may restore the ovaries and their attachments to their normal condition). (4) Removal of the affected ovary or ovaries by abdominal or vaginal section, if adhesions have rendered other treatment unsuccessful and the system calls for such grave measures.

Describe hernia of the ovary.

In congenital hernia of the ovary the ovary on one or both sides lies in the labium majus, having come down through the unobiterated canal of Nuck. The swelling may be mistaken for the testis, as in some cases of supposed hermaphroditism; when congenital it is often irreducible, and may give pain on locomotion and coitus. The treatment consists in the application of a suitable truss where the hernia is reducible. For irreducible hernia a concave protective truss-pad may be worn, or if symptoms are sufficiently severe the ovary may be removed by a labial incision.

In acquired hernia of the ovary, the ovary may form part of the contents of an inguinal, femoral, sciatic, or ventral hernia. The *symptoms* and *treatment* are the same as for the congenital variety.

OVARIAN APOPLEXY.

Describe ovarian apoplexy.

The lesion is a rapid effusion of blood into the substance of the ovary from rupture of one or more of its larger blood-vessels. (It is not to be confounded with the physiological extravasation from which the corpus luteum is produced.) It may be small, or it may distend the ovary to the size of an orange, or it may rupture. Its *cause* is either some mechanical shock or a pathological exaggeration of the hemorrhage during ovulation. *Symptoms* are: sudden and violent pain over one ovary, combined with some of the symptoms of internal hemorrhage. *Diagnosis* is difficult. With the symptoms mentioned above and the presence of a cystic tumor felt on digital examination, the contents of which on aspiration through the vaginal wall were found to be dark-bloody fluid, this diagnosis would probably be correct. *Prognosis* is grave. The blood-clot may become absorbed or organized, but if the ovarian tissues have been largely disorganized, even this favorable termination may be followed by symptoms (pain chiefly) calling for radical treatment. In unfavorable cases the hematoma may rupture into the peritoneal cavity (forming a pelvic hæmatocèle shut off by peritonitic adhesions from the general cavity), or between the layers of the broad ligament, where a mass may be formed giving rise to pressure symptoms.

Treatment.—Early: check hemorrhage by rest in bed and ice-bags, and control pain by morphine. Later, if peritonitis develop, this is to be treated in the usual way. When the acute symptoms are over, treatment is directed toward the reabsorption of the effusion, similar to that for inflammatory pelvic exudations. If symptoms are sufficiently severe, removal of the affected ovary is indicated.

INFLAMMATIONS OF THE OVARY.

What are the two degrees of ovarian inflammation?

Acute ovaritis; chronic ovaritis.

Describe acute ovaritis.

This may be puerperal or non-puerperal. In the former case the

process is more severe, and termination in suppuration is more common, than in the non-puerperal form, where resolution is the rule. The *causes* are acute endometritis, acute salpingitis, pelvic peritonitis, gonorrhœa, disturbance of menstruation. The *symptoms* are those of pelvic inflammation—fever, pain, and sensitiveness. If resolution takes place, the symptoms subside after four or five days, but if suppuration occurs, there are rigors and irregular rise of temperature, and finally symptoms referable to the rupture of an abscess into the peritoneum, rectum, bladder, or vagina. The *prognosis* in puerperal cases is grave; in non-puerperal cases it is fairly good. In all cases the ovary is left somewhat damaged, and in gonorrhœal cases of double ovaritis, sterility is sure to follow. *Treatment* consists in antiphlogistics and opiates, and, if suppuration occurs, extirpation of the ovary by laparotomy or drainage of the abscess-cavity by abdominal, rectal, or vaginal incisions.

Describe chronic ovaritis.

Pathology.—In the early stages the condition is that of chronic congestion, followed by infiltration with sero-sanguinous fluid and an increase in bulk. In the later stages the capsule thickens, the follicles enlarge, and a general hypertrophy takes place. It starts commonly as a subacute or chronic affection, rarely as an acute ovaritis.

Causes.—They are those that produce prolonged congestion of the generative organs: laceration of the cervix or perineum; sub-involution; dysmenorrhœa; uterine tumors; displacements and flexions; sterility; efforts to prevent conception; intercourse with impotent men; masturbation; emotional causes (long engagements, disappointment in love, reading corrupt literature, etc.).

Symptoms.—Dysmenorrhœa; fixed ovarian pain; tendency to hysteria; rarely pain on locomotion; sometimes dyspareunia; pain and exhaustion after defecation; pain in rectum, hips, and down thighs; irregular menstruation; sterility if both ovaries are affected.

Treatment.—(1) Removal of causes of congestion (thus, repair of laceration of cervix or perineum, correction of displacement or flexion of the uterus, regulation of the bowels and of sexual relations, etc.). (2) Reduce pelvic engorgement directly by scarifying the cervix; prolonged hot vaginal douches; painting the vaginal fornix with tincture of iodine if tenderness and induration appear in either broad ligament; rest during menstruation; bromides,

general tonics, and sometimes a sea-voyage. (3) The very best treatment is Weir Mitchell's rest-cure. (4) Some cases resist all treatment, and are sufficiently serious to justify the removal of the affected ovary or ovaries.

ABSCESS OF THE OVARY.

Describe abscess of the ovary.

It is a collection of pus in the substance of the ovary. It occurs almost exclusively in connection with gonorrhœal or tubercular inflammation of the genital tract. It gives no very characteristic symptoms in addition to those of the disease it complicates, but may commonly be diagnosed by finding on physical examination the ovary distended with fluid, while the presence of irregular temperature and rigors indicates its purulent character.

Treatment is commonly removal of the ovary by laparotomy or drainage of the abscess-cavity by the incision which seems most appropriate for the individual case.

NEOPLASMS OF THE OVARY.

Enumerate the neoplasms of the ovary.

I. Solid Tumors.

Carcinoma,	}	malignant; fairly common;	accompanied by rapidly developing ascites.
Sarcoma,			

Papilloma,	}	doubtful; rare;	no distinguishing symptoms.
Fibroma,			

II. Cystic Tumors.

Cysto-carcinoma,	}	malignant.
Cysto-sarcoma,		

Cysto-fibroma,	}	benign.
Dermoid cyst,		
Ovarian cyst (mono- or polycystic),		

DERMOID CYST OF THE OVARY.

Describe dermoid cyst.

In various parts of the body (the orbit, floor of the mouth, brain, eye, anterior mediastinum, lung, mesentery, testicle, and ovary) tumors may occur, containing fatty matter, teeth, hair, cartilage, and

bone. Their origin must be in some foetal inclusion of epiblast and irregular subsequent development of the same. Those occurring in the ovary vary in size from that of a hen's egg to that of a human head. In themselves they give no special symptoms, but always present the risk of rupture into the peritoneal cavity or of suppuration. They should probably always be removed by ovariectomy.

OVARIAN CYSTS.

What is the pathology of ovarian cysts?

The development of cysts within the ovary without the coincident development of solid elements, as fibroma or carcinoma. Most of the cysts are developed from the Graafian follicles by a sort of colloid degeneration, but it is claimed that some may originate in cystic degeneration of the ovarian stroma. The cyst may be monocystic or polycystic; and in the latter case the separate collections of fluid may be enclosed by thick or very thin walls. The fluid may be very thin and clear, or may be viscid, or even almost gelatinous; its color varies from a pale yellow to that of weak coffee. Under the microscope certain bodies, "Drysdale's cells," are seen which are not distinctly altered by acetic acid (which does markedly change the appearance of leucocytes, etc.); they are characteristic of fluid from an ovarian cyst, but not absolutely diagnostic. The pedicle consists of the broad ligament, the Fallopian tube, the round ligament, the ovarian vessels, etc. In one variety, "intraligamentous cysts," there is no true pedicle, and the tumor can only be removed by difficult dissection; often it can only be drained.

What are the causes?

Predisposing.—Age twenty to fifty most common; childbearing; chlorosis; scrofulous diathesis; menstrual disorders; deprivation and bad hygiene.

Exciting.—Uncertain; ovaritis, acute or chronic; the various causes of pelvic congestion. In the great majority of cases the woman has been apparently perfectly well until the tumor has developed and reached a size at which it has given symptoms.

What are the symptoms?

They are not pathognomonic, and are largely due to the pressure of the tumor upon the pelvic and abdominal structures as it gets

larger and larger. (The tumor reaches a size from that of a human head to a mass weighing sometimes over a hundred pounds.) The abdomen is distended; there are marked emaciation of the lower extremities, emaciation of the face, and a peculiar expression, "facies ovariana."

What are the complications?

Pregnancy; fibroids of the uterus; carcinoma of the uterus; renal disease; disease of the liver, heart, or lungs; compression of the ureters; elevation of the bladder.

What is the prognosis?

If untreated, spontaneous cure is possible by rupture and absorption of the fluid: 50 per cent. of cases rupturing and untreated are, however, fatal; or by calcareous degeneration; but cure in this way is extremely rare. The ordinary course is for the tumor to go on increasing in size, and finally to cause death in one of the following ways: (1) Rupture of cyst (with or without suppuration) and production of peritonitis. (2) Inflammation of the cyst-wall, filling the cyst with pus; finally septic infection, and death. (3) Twisting or rupture of the pedicle, gangrene of the cyst, septicaemia. (4) Prolonged interference with the nutrition and respiration. (5) Acute or chronic peritonitis, rapid or slow exhaustion. (6) Fatal hemorrhage into the cyst. (7) Simply gradual exhaustion.

Enumerate the conditions from which a small ovarian cyst in the pelvic cavity must be diagnosed.

Solid ovarian tumors; cysts of the broad ligaments; distended tubes; normal pregnancy; normal pregnancy with retroversion; extra-uterine gestation; fibroid tumors of the uterus; uterine moles; peritonitic exudation or abscess; inflammatory exudation in the broad ligament; pelvic haematocele; spina bifida; faecal accumulations; inflammation of the vermiform appendix; tumors of the pelvic walls.

Give the differentiation from a distended tube.

History.—This condition begins with the symptoms of an acute inflammation, negative in the case of an ovarian cyst.

Shape.—Tubal elongated, ovarian globular.

Relation.—Tubal more intimate to uterus than in the case of ovarian cyst.

Sensitivity.—Tubal marked, ovarian slight.

Contents.—Straw-colored in hydrosalpinx, and pus in pyosalpinx ; in ovarian cyst as above described.

Give the differentiation from peritonitic exudation or abscess.

History of acute inflammation, fixation, less rounded outline, and less distinct fluctuation ; pus found on puncture when fluctuation does exist. Sensitiveness, usually in Douglas's pouch, while an ovarian cyst is commonly lateral.

Give the differentiation from an exudation into the broad ligament.

History of inflammation after some operation or after labor or abortion. Haematoma would give a history of sharp pain with more or less prostration and rapid development of the tumefaction ; fixity and tenderness.

Give the differentiation from extra-uterine gestation.

Rapidity of growth and the presence of many of the signs (morning sickness, changes in the breasts and vagina, etc.) of normal pregnancy ; amenorrhœa followed by irregular menorrhagia (in ovarian cyst menstruation is little affected) ; increase in size of the uterus ; greater fixity of the tumor ; pain from recurrent attacks of acute peritonitis ; finally symptoms of rupture (pain, shock, collapse, and, if untreated, death from hemorrhage or peritonitis).

Enumerate the conditions from which a large ovarian cyst in the abdominal cavity must be differentiated.

Solid Abdominal Tumors.—Of the anterior abdominal wall (desmoids) ; of the omentum ; of the spleen, kidney, or liver ; of the ovary or uterus (fibroid or fibro-cystic) ; of the retro-peritoneal connective tissue.

Cystic Tumors.—Of the omentum or mesentery ; of the liver, pancreas, or kidney ; of the broad ligament ; parasitic cysts (hydatid, etc.) ; haematometra ; vesicular mole ; hydrosalpinx.

Pregnancy.—Normal ; with dropsy of the amnion ; abdominal pregnancy.

Ascites.—Simple ; encysted ; tubercular peritonitis ; tympanites ; phantom tumor ; distension of bladder or stomach.

Give the differentiation from ascites.

In this the abdomen is flatter in the recumbent position, and convex when standing. If the patient turn over, the relation of the areas of tympanitic resonance to the area of fluid flatness changes. There is a perfect wave of fluctuation transmitted across

the abdomen. No encysted or circumscribed wave can be made out, and there is generally a history of some cause (as renal or hepatic disease, etc.) to account for it.

Give the differentiation from normal pregnancy.

This would give the regular changes in the breasts, vagina, cervix, etc., presence of ballottement, uterine bruit, foetal heart-sounds; perhaps foetal parts may be made out on palpation; rhythmic uterine contractions; absence of fluctuation and of the haggard expression characteristic of ovarian cyst. Amenorrhœa is not positive evidence, but probable.

Give the differentiation from distension of the bladder.

The introduction of a catheter and the immediate disappearance of the swelling are conclusive.

Give the differentiation from uterine fibroids and fibro-cysts.

A fibro-cyst of the uterus cannot be positively diagnosed from an ovarian cyst except by exploratory laparotomy. A fibroid would give a history of slow development, menorrhagia, uterine souffle, close connection with the uterus, increased general deposit of fat, and some pigmentation of the skin, as in pregnancy; uterine cavity increased in length.

Detail the treatment of ovarian cysts.

Curative.—Removal by laparotomy.

Palliative.—Evacuation of cyst-contents by aspiration or tapping.

The procedures indicated under the second heading have many objections, and are resorted to only when, as in pregnancy, the tumor gives rise to urgent pressure symptoms, and a resort to the major operation seems too risky.

CYSTS OF THE BROAD LIGAMENT, OR PAROVARIAN CYSTS.

Describe these cysts.

They develop between the layers of the broad ligament in the parovarium or organ of Rosenmüller, which is a remnant of the foetal Wolffian body. They are always monocystic, and tend to grow down into the pelvis, and only into the abdominal cavity after they have attained considerable size. They grow more slowly than ovarian tumors, and have no marked effect upon the general health.

The best *treatment* is laparotomy, incision of cyst, evacuation of

contents, excision of the excess of cyst-wall, suture of cyst-wall in the abdominal wound, and packing with iodoform gauze.

LAPAROTOMY FOR THE REMOVAL OF THE UTERINE APPENDAGES OR OF CYSTS.

Ovariotomy.

What instruments are required ?

Scalpel ; mouse-tooth forceps, 2 ; dissecting forceps, 2 ; Tait's clamps, small, 6 ; large, 6 ; right aneurism needles, 4 ; left, 1 ; uterine sound ; scissors, curved, straight, angular ; double volsella, 3 ; trocar and canula ; artery clamps, 12 ; Paquelin cautery ; needles, long, curved, spear-pointed, 6 ; medium, curved, spear-pointed, 6 ; small Hagedorn, 6.

Also the following materials : silk, heavy floss or braided for pedicles ; finer for sutures and carrying wire sutures ; catgut, Nos. 2 and 3 ; silver wire, No. 24 ; glass drainage-tubes ; antiseptic dressings.

What are the steps of the operation ?

The bladder and rectum have been evacuated shortly before, and no solid food has been taken for five hours preceding the operation. The patient lies upon her back upon a flat operating table, or Trendelenberg's table may be used.

First Step.—Preparation of the field of operation. The pubes is shaved and the abdomen scrubbed with soft soap and warm water ; it is then wiped off with alcohol, turpentine, ether, and bichloride of mercury 1 : 1000. Wet bichloride towels are spread about.*

* Instruments have been sterilized by boiling in a 1 per cent. solution of carbonate of soda, and are kept in carbolic acid 1 : 40 ; hands and forearms of operator and assistants have been disinfected by scrubbing with soap and water, followed by alcohol and bichloride. Silk and silver wire are prepared by boiling. Catgut is prepared by immersion for eight hours in ether, eight hours in bichloride, 1 : 1000, and then in several changes of alcohol, in which it is finally stored. A most desirable addition is the final boiling in alcohol for one hour over a water-bath ; a condenser may be used to prevent loss of alcohol. Chromicized catgut is prepared by washing in alcohol and then immersing for forty-eight hours in water 100 parts, carbolic acid 5 parts, and bichromate of potash 0.2 parts ; it will not be absorbed by the tissues for a week, and is used for ligatures (as on pedicles) where this *property of non-absorbability* renders it valuable.

Second Step.—Incision in the median line between the umbilicus and the symphysis of an average length of four or five inches. The tissues are divided layer by layer, and hemorrhage is checked before the peritoneum is opened. A fold of peritoneum is held up by two mouse-toothed forceps and nicked; a grooved director is then introduced, and the peritoneum divided with scalpel or scissors, or the fingers may take the place of the grooved director.

Third Step.—Tapping the cyst (for tubal disease or solid tumors of course this would be unnecessary). Emmet's long curved trocar and canula are used; abdominal compression is made as the contents escape; an effort is made to prevent the entrance of even a single drop of the fluid into the abdominal cavity; the aperture is clamped as the canula is withdrawn.

Fourth Step.—Drawing out the sac. This is done with volsella and gentle traction with the fingers. Adhesions to the abdominal wall, omentum, large intestine, and mesocolon may be found, and less frequently to the small intestine, bladder, liver, diaphragm, and the walls of pelvis. These are either gently separated or are ligated and divided: their treatment constitutes the only difficulty in the operation.

Fifth Step.—Securing the pedicle. This is best done by compressing the pedicle with any suitable clamp, cutting off the tumor, ligating the pedicle by the Staffordshire knot (Fig. 84), cauterizing the cut surface with the Paquelin cautery, removing the clamp, and allowing the pedicle to fall into the pelvis.*

Sixth Step.—Peritoneal toilet. All hemorrhage has been checked, and in ordinary cases it is necessary simply to lightly sponge out the pelvic and abdominal cavities with sponges on holders. In other cases, where trouble is feared from access of the fluid to the peritoneum, the entire peritoneal cavity is flushed out repeatedly with sterilized water or Thiersch's solution at a temperature of 100° F.

FIG 84.



Staffordshire Knot.

* The Staffordshire knot is tied as follows: pass a strong straight needle, threaded double with heavy pedicle silk, through the pedicle and under the clamp. Then pull the loop through and remove the needle. Now pass both the clamp with the distal extremity of the pedicle and one of the loose ends of the ligature through the loop by drawing the loop forward. Then draw each end tight, and tie very tightly a square knot.

Seventh Step.—Drainage. A glass drainage-tube is introduced at the lower angle of the wound, and reaches down into Douglas's pouch; it is lightly filled with iodoform gauze. Drainage may often be omitted.

Eighth Step.—Suture and antiseptic dressing. The suture may pass through all layers at once, or the peritoneum, the muscles, the fascia, and the skin may be sutured separately.

After-treatment.—Absolute rest in bed; an eighth of a grain of morphine hypodermically is often sufficient to control pain and restlessness. The packing in the tube is removed in three hours, and such fluid (bloody serum) as has accumulated is sucked out by a syringe with a long rubber tube attached; fresh packing. This is repeated at least once in three hours, and the tube is commonly removed in twenty-four hours or less. Vomiting is prevented by not giving anything by the mouth for six or twelve hours after operation. The bowels should be moved in forty-eight hours. Sutures are removed at about the ninth day, and in three weeks the patient is commonly well.

Battey's Operation, or Oöphorectomy.

Describe this operation.

It is the removal of the normal or not very greatly changed ovaries for the relief of symptoms which do not yield to other treatment. The indications for it are—uterine fibroids (to check their growth), chronic pelvic inflammations, chronic ovaritis and ovaralgia, ovarian insanity, ovarian epilepsy (of course only in carefully considered and selected cases).

The details of the operation are the same as those of ovariotomy, except that the ovary is simply brought up into the wound by the fingers and seized by fenestrated forceps: its pedicle is transfixated by a double ligature, tied, cut away, and allowed to drop back into the pelvis: the cut surface may be touched with the Paquelin cautery.

Tait's Operation.

Describe this operation.

It is the removal of ovaries and tubes for the same conditions as Battey's operation. It involves as an additional step ligature of the broad ligament in sections before the ovary and tube can be cut away.

DISEASES OF THE FALLOPIAN TUBES.

SALPINGITIS.

Describe salpingitis.

The acute variety is commonly the extension of a gonorrhœal inflammation of the lower genital tract. It may, as latent gonorrhœa in the female (Noeggerath), be a very common cause of sterility, and may be acquired from a very old and *apparently* cured gonorrhœa in the male. Acute salpingitis may, however, occur without venereal infection. Chronic salpingitis may follow an acute attack or may develop gradually of itself.

What is its pathology?

The mucous membrane is thickened and thrown into ridges; the inflammation extends to the peritoneal coat, and, from cicatricial contraction and pressure and traction by adhesions, deformity and stricture of the tube may result, the lumen at each extremity may be obliterated, and a collection of the hypersecretion of the mucous membrane may take place. The condition is termed hydrosalpinx, pyosalpinx, or haematosalpinx according as the contents of the distended tube are clear, limpid fluid, pus, or principally blood.

What are the causes of salpingitis?

Gonorrhœal infection, septic infection from other causes, exposure during menstruation.

What are the symptoms?

Acute salpingitis: Sharp pain in one or both sides of the pelvis; moderate rise of temperature; tenderness in the region of the tube, which may sometimes be felt on bimanual examination.

Chronic salpingitis: Menstrual colic; leucorrhœal discharge. On bimanual examination the tube can commonly be felt to be thickened and irregular.

What is the treatment?

Acute salpingitis: Rest in bed; antiphlogistics (ice over hypogastrium or prolonged hot vaginal douches); leeches perhaps; blisters.

Chronic salpingitis: Repeated blisters over iliac region; counter-irritants to the fornix of the vagina; tampons of boroglyceride, or 8 per cent. ichthylol in glycerin; hot douches; alterative sitz-baths (warm solution of sea-salt, etc.); galvanic current; salpingo-

oophorectomy if the symptoms are sufficiently urgent and persist in spite of treatment.

What are the special features of hydrosalpinx?

History of catarrhal salpingitis and very mild pelvic peritonitis; symptoms of pain and pelvic pressure. A tense, smooth, elastic oval mass is felt in Douglas's pouch; it may be fixed or movable. Clear fluid is drawn on aspiration *per vaginam*. The disease seldom threatens life.

Treatment is either by evacuation *per vaginam* or removal of ovary and tube by laparotomy.

PYOSALPINX.

What are the special features of pyosalpinx?

In consequence of repeated attacks of salpingitis both extremities of the tube have become impermeable, and the cavity is distended with several ounces of pus. The *symptoms* are those of recurrent pelvic peritonitis, with freedom from pain between the attacks. A tense, fluctuating, rather fixed, mass is felt in Douglas's pouch, which on aspiration yields pus. Dangers are of rupture into the peritoneal cavity, but this is commonly prevented by adhesions.

Treatment is in most cases best by removal of ovary and tube by laparotomy. Where the abscess is opened through the vagina and drained or packed it is very difficult to bring about obliteration of the cavity.

HÆMATOSALPINX.

What are the special features of hæmatosalpinx?

The tube is distended with fluid blood from rupture of a tubal pregnancy, from the regular monthly hemorrhage from the mucous membrane of the tube, or from regurgitation from the cavity of the uterus. *Symptoms* are pain and pressure. Even when its production is sudden, the amount of blood taken from the general circulation is not enough to give the symptoms of anæmia. The chief danger is of intraperitoneal rupture.

Treatment is removal of ovary and tube by laparotomy, or, if the cavity be intraligamentous, not a true hæmatosalpinx, incision and drainage from the vagina.

LAPAROTOMY FOR PYOSALPINX, ETC.—“SALPINGO-ÖPHORECTOMY.”

This operation differs from ovariotomy in the fact that both tube and ovary on the affected side are removed, and that it is thus necessary to ligate the broad ligament in sections before cutting the tube away.

EXTRA-UTERINE PREGNANCY.**What are the principal varieties ?**

Tubal, interstitial, and abdominal pregnancy.

What are the causes ?

Stricture of the tube; constriction or flexion of the tube by adhesions; tumefaction of the mucous membrane of the tube from chronic salpingitis.

What are the symptoms ?

For the first two or three months there are amenorrhœa and the ordinary symptoms of pregnancy. Then the patient may suddenly exhibit the symptoms of pelvic haematocele: intense pain, nausea, and collapse; if untreated, death may follow from acute anaemia or septic peritonitis, or a slow recovery may take place. In other cases the symptoms which first attract attention are irregular and profuse discharges of blood from the uterus, pain, and a rapid enlargement of the hypogastrium.

What are the physical signs ?

The uterus is distinctly enlarged and softened, and is displaced upward and to one side. Its cavity is slightly increased in length, and on dilatation of the cervix it is proven to be empty. In Douglas's pouch or a little to one side a tumor may be felt: it is rather fixed, not very sensitive, fluctuating, and sometimes gives ballottement.

What is the diagnosis ?

It must be differentiated from uterine fibroids or fibro-cysts; cyst of the ovary or broad ligament; pelvic haematocele; gestation in one horn of uterus bicornis; pregnancy in a retroverted uterus; pelvic inflammatory exudation or abscess.

What are the course and prognosis ?

The *prognosis* is bad. If untreated, rupture sooner or later

occurs in almost all cases, and death may then occur from hemorrhage, septicæmia, peritonitis, and perforation of important viscera; or the hæmatocoele thus produced may terminate favorably, and the fœtus, now dead, may be converted into a lithopaedion and may give no further trouble, though it is always liable to do so.

What is the treatment?

For a ruptured extra-uterine gestation there is only one thing to be done: laparotomy and removal of the sac and its contents. Unruptured cases may properly be first treated by methods calculated to destroy the life of the fœtus, and hence, by reduction of vascularity, the subsequent removal may be very much less dangerous. These methods are—*electricity* (faradic current, one pole placed either in the vagina or rectum; sittings repeated until the sac ceases to grow: it would be worse than useless if there were any symptoms of impending rupture). Aspiration of the amniotic fluid was formerly performed; also the injection of different substances into the sac; but these have been abandoned.

In cases of distinctly abdominal pregnancy which have passed the first three or four months, interference should be withheld until, at about full term, an attempt at labor gives the indication for laparotomy, with a moderate chance for both mother and child.

DISEASES OF THE PELVIC PERITONEUM AND FASCIÆ.

PELVIC PERITONITIS.

Define and give the synonyms.

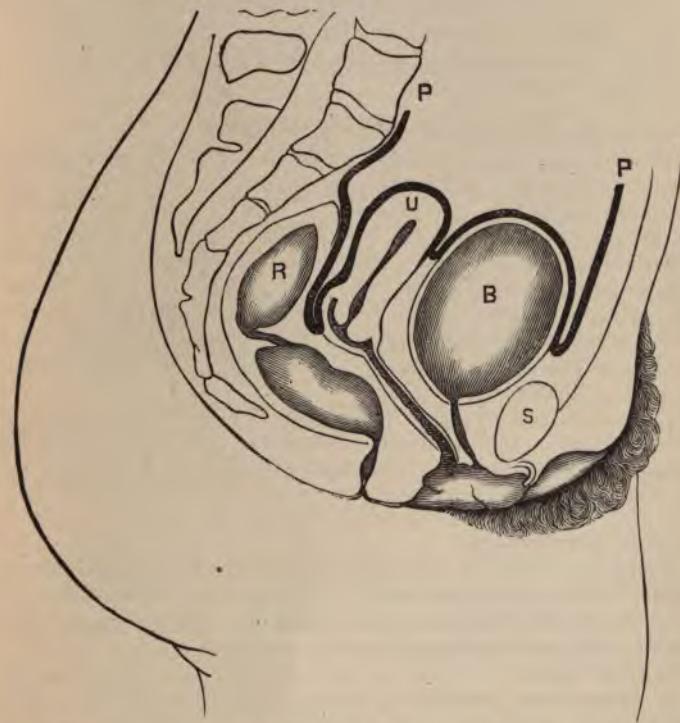
Pelvic peritonitis is an inflammation of that portion of the general peritoneum which lines the pelvis and invests the pelvic viscera. It is one of the most common diseases. The *synonyms* are perimetritis and pelvo-peritonitis.

Describe the pelvic peritoneum.

- From before backward it is reflected on to the bladder from the anterior abdominal wall about $1\frac{1}{2}$ inches above the symphysis; covers the fundus, and crosses to the uterus on a level with the os internum, forming the vesico-uterine pouch and vesico-uterine ligaments. The vesico-uterine pouch is normally empty, and lies more than $\frac{1}{2}$ an inch above the anterior fornix of the vagina. The *peritoneum* invests closely the anterior surface of the uterus, passes

over the fundus, and covers the entire posterior surface. Laterally it passes off to the sides of the pelvis, forming the broad ligaments. Posteriorly it continues down, investing the vaginal wall for about

FIG. 85.



Pelvic Peritoneum, indicated by dark line, *PP*, which does not extend sufficiently between *U* and *B*.

an inch; passes on to the rectum, forming the pouch or cul-de-sac of Douglas and the utero-sacral ligaments. It covers the anterior surface of the middle portion of the rectum, and completely surrounds the upper part.

What fossæ are formed by reflections of the pelvic peritoneum?

The utero-vesical in front and two lateral pouches, the paravesical; the pouch of Douglas behind, and two lateral pouches just outside the utero-sacral ligaments.

The pouch of Douglas is the lowest part of the pelvic peritoneum. It is the first part to be filled with fluid, and may contain loops of intestine or tumors, ovaries, etc. It is separated from the vagina by only one-fourth of an inch of tissue, and extends down a little deeper on the left side.

What is the pathology of pelvic peritonitis?

Pelvic peritonitis is usually localized. The serous membrane first loses its shiny, glistening appearance from loss of epithelium and from exudation. If there is a slight amount of fluid, the surfaces may adhere to each other; if the serum is considerable, adhesions may be prevented and the fluid absorbed; or it may be encapsulated, forming peritoneal cysts. The inflamed surfaces are covered with a reddish-yellow pseudo-membrane, consisting chiefly of newly-formed connective tissue (plastic lymph), which may be so profuse as to fill up all the cracks and cause adhesion of all the viscera.

In severe forms, such as are produced from puerperal septicæmia and gonorrhœa, the fluid becomes purulent. The varieties of pelvic peritonitis are—*adhesive peritonitis, sero-adhesive peritonitis, purulent peritonitis.*

What is the etiology?

Pelvic peritonitis is generally secondary to inflammation of the uterus, ovaries, and tubes, and these are generally induced by—

1. Taking cold during menstruation, first giving rise to endometritis, then salpingitis, and finally peritonitis.
2. Gonorrhœa.
3. Traumatism, passage of sound, applications to the cervix having been known to cause peritonitis.
4. Septic infection by instruments or during parturition and abortion.
5. Entrance of foreign substances into the pelvic cavity; rupture of a pyosalpinx or ovarian abscess, or injection of fluids through the uterus and tubes; hæmatocoele.
6. Mechanical irritation; displaced uterus or ovary; improperly applied pessary.

7. New growths; cancer; tubercular peritonitis.

Pelvic cellulitis. Owing to the intimate anatomical connection of the pelvic fascia and peritoneum usually both inflammations result from the same cause.

What are the symptoms?

These may be acute or chronic.

Acute: Sharp chill; temperature not high, 101°-102°; rapid pulse, 120 or more; pain and tenderness in lower part of abdomen; knees drawn up; tongue furred early; nausea and vomiting; constant desire to pass water; severe rectal and vesical tenesmus; constipation; tympanites; sometimes menorrhagia. Temperature may rise later to 105° or 106°, with general involvement of the peritoneum; but the inflammation usually subsides in a few days, or becomes chronic, or goes on to the formation of an abscess.

Chronic: The symptoms of the subacute and chronic form may be very indefinite, and at first unrecognized. The whole pelvic contents may be massed together without any symptoms. There are usually dull aching pain in the pelvis, dyspareunia, menorrhagia, and metrorrhagia. The pain may be intermittent in character, but all the symptoms may be remittent, with exacerbations. Obstinate constipation, with rectal and vesical tenesmus, is a common symptom.

What are the physical signs?

Tenderness on pressure in the fornices; utero-sacral ligaments thickened, tender, and feeling like tense cords behind the cervix. The uterus may be fixed by adhesions. When the exudation of plastic lymph is considerable, we may get the "cardboard feel," in which the fornices feel hard and resistant, as if plaster of Paris had been poured into the pelvis and hardened. When there is considerable serum or pus shut off by adhesions, it may form a tumor behind the uterus and bulge into the vagina.

What are the complications?

Diseases of the uterus, ovaries, tubes, bladder, and rectum; displacements of the uterus and ovaries; stenosis and inflammation of the tubes, resulting in sterility; extra-uterine pregnancy; disturbances of menstruation.

What is the prognosis?

Mild cases may exist for life and give no discomfort, or may gradually disappear. Large plastic exudations disappear very

slowly, and result in displacements. Serum may be absorbed or go on to suppuration. Pus, more grave, may become encapsulated or rupture into neighboring organs, or give rise to septicæmia, pyæmia, and death.

What is the differential diagnosis?

- The low temperature may distinguish it from cellulitis. It must be differentiated from fibroid tumors, faecal impaction, and pelvic hæmatocele. The history will in most cases suffice.

What is the treatment?

Acute cases: Absolute rest in bed; give enough opium or morphine to relieve the pain; limit the inflammation by an ice-bag or coil on the abdomen; later, apply hot poultices to the abdomen, and give hot vaginal injections; move the bowels by calomel and an enema.

Chronic cases: Attend to the general health by the administration of tonics, fresh air, exercise, and keeping the bowels well regulated.

Hot douches; tampons of glycerin or ichthylol in glycerin 5 per cent. to 8 per cent.; painting the fornices with iodine. For the adhesions, properly applied massage or electricity sometimes acts very well. Blisters in the iliac regions are sometimes used. The following prescription is excellent for keeping the bowels regulated in these cases:

R.	Extract. cascara sagrada., fl.	3ss;
Tr.	nucis vomic.,	ml. v;
Tr.	belladon.,	ml. iiij;
	Glycerin.,	ml. x;
	Aqua menth. pip. q. s.,	3j.—M.
Ft.	3j.	

When there is a collection of pus with no signs of pointing, it must be evacuated and drained. This may be done through the vagina or abdominal wall.

PELVIC CELLULITIS OR PARAMETRITIS.

What is the function of cellular tissue? and where is it found?

It acts as a buffer and steadies the pelvic organs; it binds the organs together. It is found between the bladder and the abdominal wall (the prevesical space of Retzius); in front of the cervix;

behind the uterus; between the layers of the broad ligaments; in the utero-sacral ligaments.

What are the etiology and pathology of parametritis?

The *causes* are—(1) Septic infection, usually from childbirth or abortions (especially criminal); (2) operations on the cervix; (3) pelvic peritonitis; (4) cancerous or syphilitic disease.

The *pathological* stages are—(1) Engorgement of the blood-vessels; (2) exudation of serum, leucocytes, and plastic lymph; (3) the exudation may resolve, or less frequently go on to the formation of pus, or it may form new connective tissue and remain.

Cellulitis usually begins in the bases of the broad ligaments, and extends from there. When pus forms, it usually extends around to the prevesical space of Retzius, or it may go posteriorly. Recent investigation has shown that most of the cases formerly supposed to be cellulitis are really peritonitis and salpingitis.

What are the complications?

Pelvic peritonitis always complicates cellulitis, but cellulitis is not necessarily present with peritonitis. Inflammation of the ovaries and tubes; displacements of the uterus; thrombosis of the veins.

What is the course?

In cellulitis resulting from criminal abortions or parturition the exudation mass may be absorbed in two or three weeks, or it may remain months and years and become chronic. It may go on to the formation of pus, and the abscess thus formed may rupture into rectum, vagina, or bladder, or the pus may follow the inguinal canal and form a labial abscess. Rarely it discharges through the sacro-sciatic or obturator foramen, or into the peritoneal cavity. The abscess may then heal up from the bottom or continue discharging indefinitely.

What are the symptoms?

Acute: These usually appear on the third to the fifth day after labor or abortion: Rigor, fever up to 103° - 105° ; athenic pulse; pain not in proportion to the symptoms: leg drawn up on the side where the pain is; nausea, but rarely any vomiting; some irritability of the bladder and rectum. (When pus forms there will be septic symptoms and cessation of lochial discharge.) These symp-

toms subside in a few days and the patient gets well, or the disease goes into the chronic form or forms an abscess.

Chronic : Onset insidious. Patients may go about with a large exudation mass, experiencing only a heavy feeling of weight in the pelvis. The bowels are sluggish, alternating with diarrhoea ; menstruation becomes irregular, profuse, or scanty ; pressure symptoms may be complained of ; sciatic pain, etc. ; there may be some vesical and rectal tenesmus.

What are the physical signs ?

In *acute* cases the vagina is found dry, hot ; localized tenderness in the fornices, usually to the left of the cervix. Later, an exudation mass, tense, elastic, and moderately tender, is felt bulging into the vagina and pushing the uterus to the other side. The exudation mass is usually lateral, and rarely extends above the brim of the pelvis, as it does in peritonitis. The edge of the broad ligament may be felt running to the side of the pelvis. If pus forms, we get fluctuation and other signs of an abscess.

From what should pelvic cellulitis be differentiated ?

Pelvic peritonitis, salpingitis, pelvic haematocele, fibroids, ovarian tumors, faecal impaction, carcinoma of rectum high up.

What is the differential diagnosis between pelvic peritonitis and pelvic cellulitis ?

Pelvic Peritonitis.

May be caused by inflammations of the uterus, ovaries, and tubes.

Pain severe.

Temperature not high.

Exudation mass not apt to bulge into vagina, and is usually bilateral.

Vomiting.

Suppuration less common.

In the acute stage it may be very difficult to differentiate.

Pelvic Cellulitis.

Rarely caused by anything but labor and abortion or operations on the cervix.

Pain less severe.

Temperature high.

Exudation mass usually bulges into the vagina, and is usually unilateral.

Usually no vomiting.

Suppuration more common.

What is the differential diagnosis between salpingitis, containing serum or pus, and pelvic cellulitis ?

These cases were formerly supposed to be cellulitis. A careful bimanual examination reveals a sausage-shaped elastic tumor in

salpingitis, extending around the uterus, sometimes fluctuation. The history shows recurrent attacks of peritonitis. The patients are usually run down in health, while in cellulitis they are usually perfectly healthy. In salpingitis the mass does not bulge into the vagina.

What is the differential diagnosis between pelvic cellulitis and pelvic haematocele?

Pelvic Cellulitis.

History different from that of pelvic haematocele.

Pelvic Haematocele.

History of sharp pain; symptoms of internal hemorrhage, pallor, faintness, collapse, etc. (followed by a sharp attack of peritonitis). Physical signs of fluid in the peritoneal cavity.

What is the differential diagnosis between pelvic cellulitis and fibroid tumors?

Pelvic Cellulitis.

History of inflammation and rapid formation of the mass.

Fibroid Tumors.

Slow growth.

Painful.

Not painful or tender.

Mass fixed.

Moves with the uterus.

Less well defined.

More defined.

Menstruation irregular.

Menorrhagia increasing.

What is the differential diagnosis between pelvic cellulitis and ovarian cysts?

Ovarian Cysts.

Slow, painless growth, with no history of fever.

Rapid and painful, with history of fever.

No disturbance of menstruation.

Disturbance of menstruation.

Fluctuation.

No fluctuation.

How would you differentiate pelvic cellulitis from carcinoma of the rectum?

A rectal examination will reveal the character of the mass, and in carcinoma there will be cachexia.

What complications arise with cellulitis?

Endometritis; salpingitis and distortion of the tubes; enlargements and displacements of the uterus; destruction of the ovaries; sterility.

What is the prognosis ?

The *prognosis* is good, the time is uncertain. If suppuration takes place, and rupture has occurred into the vagina or rectum, or through the abdominal wall, the prognosis is good. If it ruptures into the ureters or bladder, it is bad.

What is the treatment ?

Prophylactic.—Thorough antiseptic precaution.

Curative.—(1) Attempt to abort by complete rest; ice-bag over the site of the severest pain. For the pain, opium suppositories. Give Dover's powder, prolonged hot vaginal douches, and poultices may be substituted for the ice-bag.

(2) After exudation has taken place promote absorption by hot vaginal douches, 2 quarts twice daily; hot poultices on the abdomen. Keep up the general nutrition and regulate the bowels.

(3) In old cases resolvents: vaginal injections, hot sitz-baths, general hot baths, pelvic pack. Counter-irritants: blisters, tr. of iodine, Paquelin cautery. Hydragogues: Glycerin tampons—boroglyceride 1, alum 1, chloral 2, glycerin 15 parts.

(4) When suppuration takes place, open wherever it points, and drain.

PELVIC HÆMATOCELE AND HÆMATOMA.**Define these.**

A pelvic hæmatocele is an effusion of blood wholly within the pelvic peritoneal cavity, and which may be enclosed by adhesions. A pelvic hæmatoma is an effusion of blood outside of the peritoneum into the cellular tissue, usually between the folds of the broad ligaments. They are more common in married women who have borne children than in unmarried; not infrequent in sterile married women.

Hæmatocele is almost always in the pouch of Douglas, displacing the uterus forward; it may be ante-uterine; hæmatoma is almost always lateral.

What are the sources of the effused blood ?

Reflux of blood from the uterus and Fallopian tubes at time of menstruation, at times due to atresia vaginalis; ruptured tubal pregnancy; ruptured pelvic vessels; ruptured cyst; excessive blood from a ruptured Graafian follicle.

The blood is first fluid, high up, and cannot be felt well. Later

it coagulates and pushes the uterus forward or to one side. Finally it sets up peritonitis (usually twenty-four hours after onset), becomes enclosed by adhesions, and may go on to suppuration or be absorbed.

What are the causes ?

Predisposing : marriage state ; frequent childbearing ; mid-menstrual period, twenty to forty years ; profuse menstruation ; anything leading to congestion of the pelvic organs ; diseases of the ovaries, tubes, or pelvic peritoneum (adhesions) ; hard work ; extra-uterine pregnancy ; varicose veins of the broad ligaments ; atresia in the genital tract ; diatheses—bleeders, scurvy ; low state of the system ; working in match-factories.

Exciting : Violence, usually the result of coitus during menstruation ; blows, falls, etc. ; sudden checking of menstrual flow by cold or emotion.

The majority of pelvic hæmatoceles are due to extra-uterine pregnancy.

What are the symptoms of pelvic hæmatocèle ?

The previous history usually shows poor health or long-standing pelvic disease, such as chronic pelvic peritonitis. Frequently there is a history of having missed two or three menstrual periods. The onset is usually sudden, ushered in by sharp, tearing pain in the pelvic region, faintness, collapse, pallor, feeble and rapid pulse, with all the other symptoms of an internal hemorrhage. The temperature is normal or subnormal, and there are nausea and sometimes vomiting. In twenty-four hours, if the patient does not die from the initial hemorrhage (usually not), peritonitis is set up. There is a sharp chill, rise of temperature, etc. Then pressure symptoms appear, with more or less dysuria and painful defecation. There may be menorrhagia or the flow may be stopped.

The *symptoms* subside in a few days, and the effused blood is slowly absorbed. If suppuration takes place, we get septic symptoms.

What are the symptoms of pelvic hæmatoma ?

This usually takes place at a menstrual period or following labor. It may result from a ruptured extra-uterine pregnancy. The symptoms are much less severe. Shock and pain are less pronounced. The effused blood forms a mass in the exact position of a pelvic cellulitis. The uterus is pushed high up over the symphysis, and

there are pressure symptoms from pressure on the pelvic nerves, bladder, and rectum. There may be œdema of the lower limbs.

What are the physical signs of hæmatocèle and hæmatoma?

Hæmatocèle is felt as a tense, elastic mass, usually behind the uterus, pushing it well forward against the symphysis. The mass is first fluctuating, then hard. Later on it grows rapidly smaller, harder, and irregular in outline. If suppuration takes place, it usually ruptures into the rectum. Hæmatoma is felt as a smaller mass, usually laterally, between the folds of the broad ligaments, pushing the uterus to one side. It is less tender than a hæmatocèle.

What is the course, duration, and termination?

The course is tedious. If the flow is severe in a hæmatocèle, the patient may die at once from shock and hemorrhage. In ruptured tubal pregnancies the *prognosis* is bad; in mild cases it is good, but patients rarely return to health. It may end in disappearance, may remain stationary for years, or it may suppurate. The prognosis in pelvic hæmatoma is good.

What is the differential diagnosis between pelvic hæmatocèle and the following diseases?

Pelvic Hæmatocèle.

History of sudden pain, shock, fainting, etc., followed by inflammation.

Uterus displaced.

Pelvic Peritonitis.

History of more gradual onset, with signs of inflammation from the beginning.

Uterus not displaced, but fixed.

Pelvic Hæmatocèle.

History of sudden onset, with sharp pain, shock, hemorrhage, etc.

Tumor at first soft, later irregular.
Less tender.

Pelvic Cellulitis.

History of onset following labor, etc., and with inflammation from the outset.

More tender.

Pelvic Hæmatocèle.

Rapid and sudden development.

History.

Sensitive.

Not attached to the uterus.

Fibroid Tumors.

Slow growth.

History.

Not sensitive.

Attached to the uterus.

*Pelvic Hæmatocèle.**Ovarian Cysts.*

Sudden onset.	Gradual development.
History.	History.
Sensitive.	Less sensitive.
First soft, then hard.	Fluctuating.

What is the differentiation from faecal impaction?

Be sure and empty the rectum.

What from carcinoma?

Chronic history; uterus not displaced.

What is the treatment of pelvic hæmatocèle?

Expectant: Check the hemorrhage; absolute rest in bed; ice on abdomen and pressure by a sand-bag; hypodermic of morphine; open the bowels early. If the cause of the hemorrhage is a ruptured extra-uterine pregnancy, open the abdomen at once under the antiseptic preparations for any laparotomy; wash out the effused blood; clamp the bleeding points and tie off the ruptured tube and broad ligament, and remove; wash out the abdomen with hot distilled water; insert a drainage-tube, and close the abdomen.

In the second stage treat the symptoms of peritonitis.

In the third stage promote absorption of the effusion by external and internal counter-irritants and hot vaginal injections. If suppuration takes place and points in the vagina, open and drain here; otherwise, open the abdomen, and, if possible, remove the entire mass, or open from the vagina and drain.

What is the treatment for pelvic hæmatoma?

Absolute rest in bed, cold on the abdomen, opium; later, hot douches, poultices, and external and internal counter-irritants. If suppuration takes place, open and drain through the vagina or through the abdomen.

MENSTRUATION.

What is meant by puberty? and what by the menopause or climacteric?

Puberty marks the transition from childhood to womanhood, when the several organs develop and menstruation commences. It marks the commencement of the childbearing period. The climacteric period, or change of life, is that period when menstruation ceases

and an atrophy of the pelvic organs takes place. Both periods are influenced by climate, heredity, and habits of life.

Puberty usually begins at about the fourteenth year, earlier in hot climates, and menstruation ceases usually between the ages of forty-two and forty-five. During both these periods the entire system feels the change, and various pathological phenomena may be developed. The climacteric period usually lasts about two years.

What are phenomena of normal menstruation?

The chief feature of menstruation is the periodical discharge of blood from the uterine cavity (every twenty-eight days), which lasts normally between four and five days. The amount varies in individuals. This discharge of blood depends upon the presence of the ovaries,* and is supposed to coincide with the rupture of a Graafian follicle. The superficial and glandular epithelium of the mucous membrane lining of the cavity of the uterus undergoes fatty degeneration once a month, disintegrates, and is cast off. The exposed capillaries beneath are readily ruptured, and cause the bleeding. When the congestion of the pelvic organs is relieved, the flow ceases. The lining membrane of the uterus is now reproduced by a proliferation of the cells beneath the former layer.

DISORDERS OF MENSTRUATION.

What are the disorders of menstruation?

Amenorrhœa, menorrhagia, metrorrhagia, dysmenorrhœa, vicarious menstruation. All of these are *symptoms* of more or less well-defined diseases, and not diseases themselves.

Amenorrhœa.

What is meant by amenorrhœa? and what are its causes, prognosis, and treatment?

Amenorrhœa is the absence of menstruation occurring between the ages of puberty and the menopause. During the periods of pregnancy and lactation it is purely physiological.

What are the causes?

Local.—Non-development of the generative organs; atrophy of the uterus and ovaries; local inflammation of the ovaries; occlusion of some portion of the genital tract.

Constitutional.—Debilitating diseases, such as phthisis, etc.;

* According to Lawson Tait, the Fallopian tubes have more influence.

anaemia, chlorosis; plethora; mental emotions; cold and wet, as wetting the feet during menstruation; poor food; changes of climate, as seen in immigrants; obesity.

What is the prognosis?

This depends upon the exciting causes. If these can be removed the *prognosis* is good. Amenorrhœa due to non-development of the generative organs is usually incurable.

What is the treatment?

When due to non-development of the generative organs and absence of the ovaries, nothing can be done. When due to anaemia and chlorosis, give Blaud's pills, 2 *t. i. d. p.c.*; regulate bowels; good food; fresh air and exercise. Permanganate of potash and the black oxide of manganese are recommended. A pill containing iron and aloes is sometimes very effectual. When due to imperfect development and with presence of the ovaries, tonics of quinine, iron, and arsenic; hot douches; boroglyceride tampons; electricity, faradic current. For the acute suppression of menstruation due to exposure to cold and wet, hot-water foot-baths and hot sitz-baths; aconite internally. When due to phthisis and other debilitating diseases the treatment is that of the disease.

Menorrhagia and Metrorrhagia.

Define menorrhagia and metrorrhagia.

Menorrhagia means a profuse menstruation; metrorrhagia means a discharge of blood from the generative tract between menstrual periods.

What is the etiology?

Menorrhagia and metrorrhagia nearly always indicate local disease of the lining membrane of the uterus, endometritis, fibroid tumors of the uterus and polypi, subinvolution, chronic metritis, retained secundines after abortion, salpingo-oophoritis, carcinoma, sarcoma and laceration of cervix; other causes, acting indirectly, are cardiac disease, engorgement of the portal circulation, certain wasting diseases, and malaria, menopause, scurvy, haemophilia.

What is the treatment?

The causes will indicate the treatment, but there will usually be found coexisting diseases of the endometrium, requiring local interference—*i. e.* curetting. The patient is placed in Sims's posi-

tion, Sims's speculum introduced, the cervix dilated with Peaslee's and Goodell's dilators, and the endometrium thoroughly scraped out with a Thomas dull curette or a Sims curette. Strict antisepsis must be observed. The uterus is then thoroughly irrigated with hot 1 : 100 carbolic, to which iodine may be added if the hemorrhage is profuse. The uterine cavity is then painted with iodized phenol (iodine gr. Ix, carbolic acid $\frac{5}{3}$ j), and an iodoform gauze tampon introduced. Drugs, such as ergot, hydrastis Canadensis, and cannabis Indica, are sometimes useful in decreasing the flow. Ergot and hydrastis should be administered for several days after a curetting.

Fibroids may require to be removed thoroughly, or the removal of the ovaries and tubes. Carcinoma and inflammations of the ovaries and tubes require their own treatment. Retained secundines must be removed by curetting as described.

Vicarious Menstruation.

What is meant by this?

A discharge of blood from some part of the body other than the uterus at the menstrual epoch. It may be associated with amenorrhœa and scanty menstruation, and indicates a watery condition of the blood, with a constitutional tendency to bleed. The blood may come from the nose, mouth, throat, breasts, open sores, or wounds.

What is the treatment?

When this is associated with amenorrhœa, the cure of this will usually stop the vicarious menstruation. If not troublesome, no special treatment is indicated.

Dysmenorrhœa.

Define dysmenorrhœa.

The term dysmenorrhœa signifies an abnormal amount of pain at the time of the menstrual epoch, occurring just before, during, and just after menstruation. It is a symptom, and not a disease by itself.

How is dysmenorrhœa classified for convenience?

The varieties of painful menstruation mentioned are *neuralgic*, *ovarian*, *congestive*, *obstructive*, and *membranous*; but they cannot be distinctly separated, being often combined.

Give the etiology, symptoms, prognosis, and treatment of neuralgic dysmenorrhœa.

Etiology.—No pathological changes can be detected in the pelvic organs. The same causes producing neuralgia in other parts of the body may act on the pelvic organs—enervating habits, anaemia, or anything depressing the system; hysteria, masturbation, rheumatism, and gout; lacerations of the cervix. Sometimes no cause can be found. It is often associated with other varieties.

Symptoms.—The pain is of a sharp, fixed character or lancinating and colicky. It may be referred to the uterus or ovaries or rarely to some distant part of the body. The pain usually appears before the flow, and continues less severe during the discharge, but it may stop with the onset of the flow. It varies in intensity.

During the intermenstrual period the patients frequently have neuralgia elsewhere.

Prognosis.—If the patients can be built up in health and adopt good treatment for a cure, recovery is probable. Parturition is said sometimes to produce a cure.

Treatment.—This is indicated by the predisposing cause. The same treatment as for neuralgia in other parts of the body. Tonics, complete change of mode of life and climate, fresh air, exercise, sound introduced just before the period, or rapid dilatation, electricity. For the pain, suppositories of cannabis Indica and belladonna or of opium may be given. The tinc. of piscidia in $\text{m} \text{xx}$ doses is highly recommended. Hot sitz-baths. Hayden's viburnum compound is excellent.

Give the etiology, symptoms, and treatment of ovarian dysmenorrhœa.

Etiology.—It is supposed to be due to disease of the ovaries, but there is often grave disease of the ovaries without any painful menstruation.

Symptoms.—Pain in the intervals between the menses, coming on a few days before the flow and diminishing with it. The pain is of a dull, aching character, accompanied by tenderness over the region of the ovaries. There may be nervous phenomena and disturbances in the tracts.

Treatment.—For ovaritis build up general health; Battey's operation as a last resort.

Define congestive dysmenorrhœa.

This form is characterized by an excessive congestion of the ute-

rus and appendages during menstruation, owing to an abnormal state of these organs, which gives rise to pain.

What is the etiology ?

Periuterine inflammation, salpingitis, displacements of the uterus, uterine fibroids, endometritis, chronic metritis, exposure to cold and wet during menstruation, plethora.

What are the symptoms ?

Sudden pain at the menstrual period. This may last during the whole period or become gradually less. It is usually accompanied by a decrease or stoppage of the flow, and some constitutional disturbances—fever, headache, nausea, constipation, rapid pulse, etc.

What is the prognosis ?

Good if the cause can be removed.

What is the treatment ?

Correct the causes. When due to exposure to cold and wet during a period, have the patient soak her feet in a hot mustard foot-bath ; wrap up in blankets and go to bed ; aid perspiration by diaphoretics ; make hot applications to the pelvis. In the intermenstrual period give hot vaginal douches ; glycerin tampons ; scarify the cervix ; prevent tight lacing and hanging heavy skirts on the waist. For the pain the same remedies as for the neuralgic form may be used.

Define obstructive dysmenorrhœa.

This form of dysmenorrhœa is due to an obstruction to the flow which may be situated in the cervix or vagina. It is not nearly as common as was supposed.

What is its etiology ?

Contraction of cervical canal, congenital, or acquired by the application of strong caustics, labor, or operations on the cervix. The stenosis may be at the external or internal os : the latter is much more commonly a cause of pain than the former. Additional causes are flexions of the uterus, fibroids and polypi, stenosis of the vagina, long conical cervix, spasmodic contractions of the internal os.

What are the symptoms ?

Pain of a colicky expulsive character, situated in the pelvis and accompanied by the passage of clots. This is due to the collection

of blood distending the uterine cavity until labor-like pains are excited. Uterine contractions finally overcome the obstruction, and there is a gush of blood and clots. This may be repeated until the flow comes. The internal os in these cases is often found hyperæsthetic on the passage of a sound.

What is the treatment?

This consists in removing the cause of the obstruction ; mechanical dilatation with Peaslee's graduated dilators and steel branched dilators ; vaginal strictures may be treated by dilatation or division.

Describe the method of dilating the cervix.

The patient may be placed in Sims's or the lithotomy position on the edge of a table. A Sims speculum is introduced, and the parts thoroughly irrigated with 1 : 2000 bichloride. The anterior lip of the cervix is grasped with a pair of bullet forceps and drawn down. The curve of the uterus having been previously ascertained, the smallest sized sound is introduced, and allowed to remain a few minutes ; then a larger sized is used, etc. ; finally a steel branched dilator is introduced and expanded. The canal may be kept patent by means of an Outerbridge wire stem, or by the passage of a graduated sound every few weeks. An anæsthetic is not always necessary in these cases.

Define membranous dysmenorrhœa.

Membranous dysmenorrhœa is the expulsion of the lining membrane of the uterine cavity, whole or in pieces, at the menstrual period.

What is its etiology ?

The true cause of this affection is not known. It may be associated with metritis or endometritis, and is usually found in cases of poor general health. The membrane consists of the superficial layer of the endometrium, with an excess of the round cells and fibres. It is usually triangular in form, its internal surface being smooth and its external shaggy. It presents numerous perforations, the openings of the utricular glands. The blood collects under this membrane and dissects it off.

What are the symptoms ?

Severe pain at the commencement of the flow, increasing in

severity until the membrane is discharged. This usually takes place on the third day, and the pain ceases. The flow is usually profuse.

For what is this liable to be mistaken?

Early abortion. It can be differentiated from this by its repetition, by the absence of chorionic villi, and by the absence of the symptoms of pregnancy.

What is the treatment?

It is very difficult to cure. Dilatation and curetting, followed by painting the endometrium with iodized phenol or iodine, may be resorted to. For the pain give hot sitz-baths and hot applications to the pelvis, together with the drugs mentioned for neuralgic dysmenorrhœa.

ELECTRICITY IN GYNECOLOGY.

What apparatus is required?

1. *Galvanic Battery*.—Made up of at least 30 cells, with large elements (per ex.: zinc and carbon plates 6×9 inches in a solution of bichromate of potash and sulphuric acid).

Accessories to Galvanic Battery.—*Rheostat*, to regulate the strength of the current by regulating the amount of resistance in the circuit; *milliampère meter*, to indicate the strength of the current.

2. *Faradic Battery*.—The most convenient is one in which the primary current is generated by a single dry cell.

3. *Conducting Wires*. 4. *Electrodes*.—Large flat electrode with sponge or soft clay surfaces for the abdomen, and a variety of electrodes with insulated stems and cylindrical, globular, or sharp-pointed metal or carbon tips for vaginal and intra-uterine use or for electro-puncture.

What are the therapeutic effects?

Relief of pain (mild faradic current); stimulation of growth and function in the uterus and ovaries (medium faradic current); haemostatic (faradic or the positive pole of the galvanic battery); absorption of inflammatory masses and adhesions (negative galvanic pole); destruction of vitality in the foetus in extra-uterine

gestation (galvanic current); alterative effect upon neoplasms, especially fibro-myoma (galvanic current).

What are the indications for the use of electricity?

Acute Inflammations.—Mild faradization, and, as a rule, not intra-uterine.

Adhesions and Exudations.—Negative pole in the vagina and a galvanic current of fifteen to fifty milliampères passed for ten minutes. Galvano-puncture has been recommended, but is less free from danger.

Amenorrhœa and Dysmenorrhœa.—Spinal galvanization, one pole over the nape of the neck and one over the sacrum; or the faradic current, with one pole over the lumbar vertebræ and one over the hypogastrium; or one pole over the hypogastrium and one in the cavity of the uterus, the current being either faradic or galvanic (negative pole in uterus).

Cervical and Corporeal Endometritis.—The negative galvanic pole is in the uterine cavity, and a current of twenty or thirty milliampères is passed for twenty minutes three times a week. For chronic cases the strength of the current may be gradually increased to one hundred or even two hundred milliampères, but the sittings should be very short.

Menorrhagia and Metrorrhagia.—The mild faradic current, with one pole in the uterus, sittings daily for twenty or thirty minutes, is quite effective. In extreme cases the positive electrode of the galvanic battery may be placed in the uterine cavity, and a current passed strong enough to act as a cauterant.

What is the value of electricity in uterine fibro-myoma?

This is the chief condition for which the use of electricity has been praised in gynecology; it is also the one for which very many eminent practitioners consider electricity valueless. The details of the treatment have already been given. The best results are obtained in the submucous variety, in which the hemorrhage may be well controlled, extrusion favored, and the growth often arrested. In the interstitial form similar results may sometimes be obtained, but in the subserous form benefit is rare and the risks are greater.

Describe the method of administering electricity in ovarian irritation.

A large ball electrode, positive, is placed in the vagina, and a

galvanic current of ten milliampères is passed for twenty minutes twice a week.

What are the results of the use of electricity in gynecology ?

In a certain proportion of cases in the above classes the results are excellent; in other cases the results are discouraging. While not a panacea, it is still a legitimate and desirable means of treatment in gynecological diseases.

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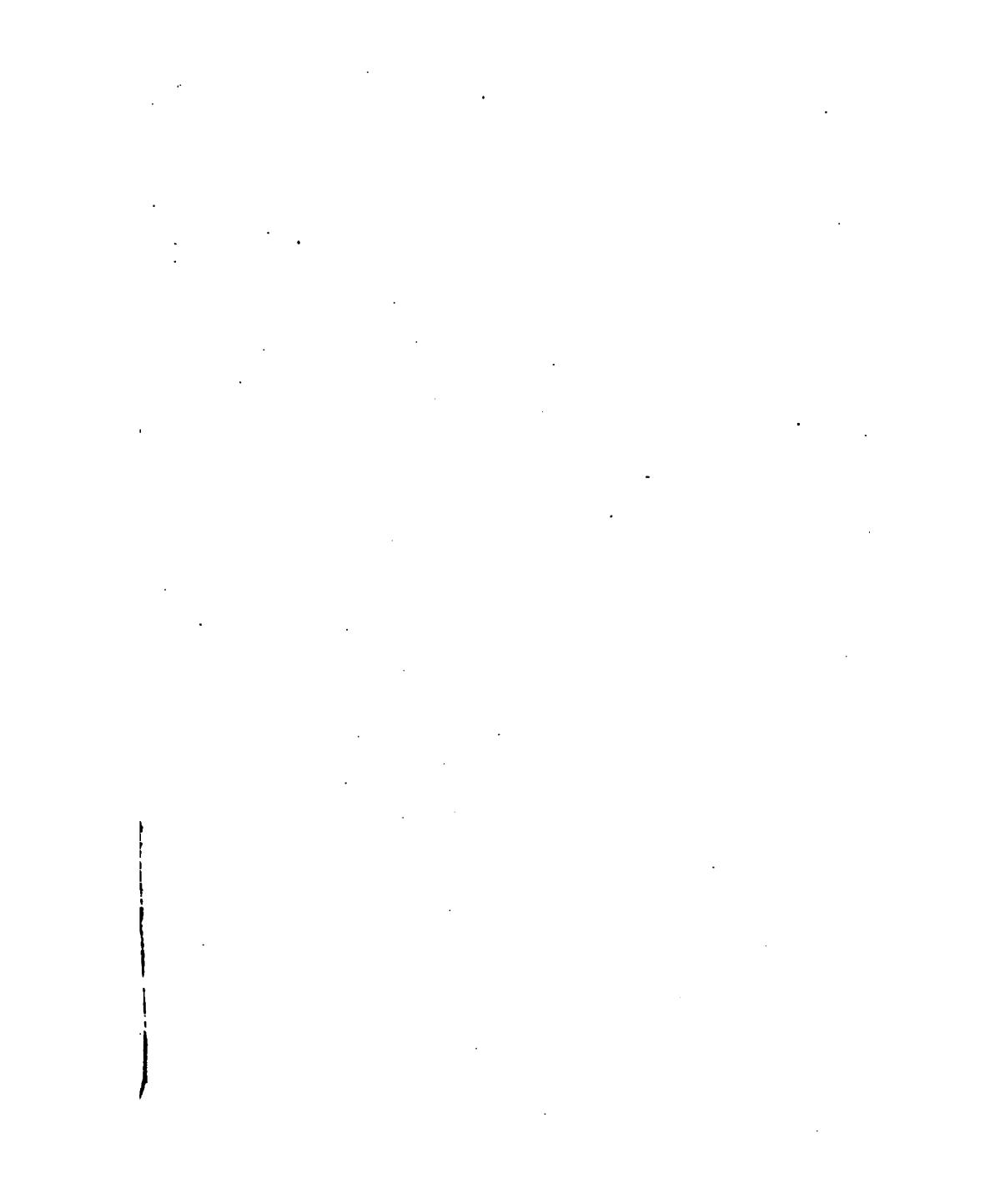
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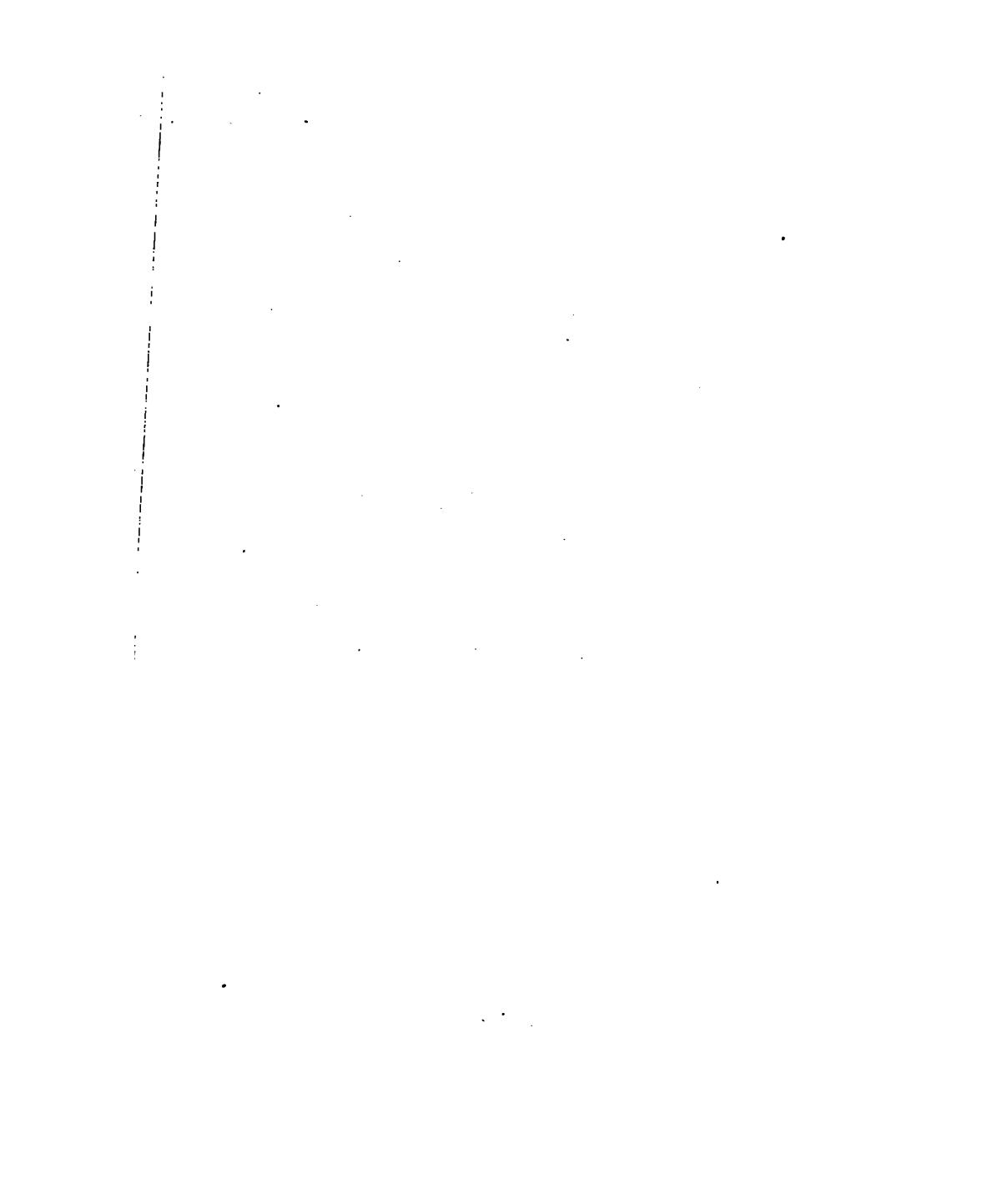
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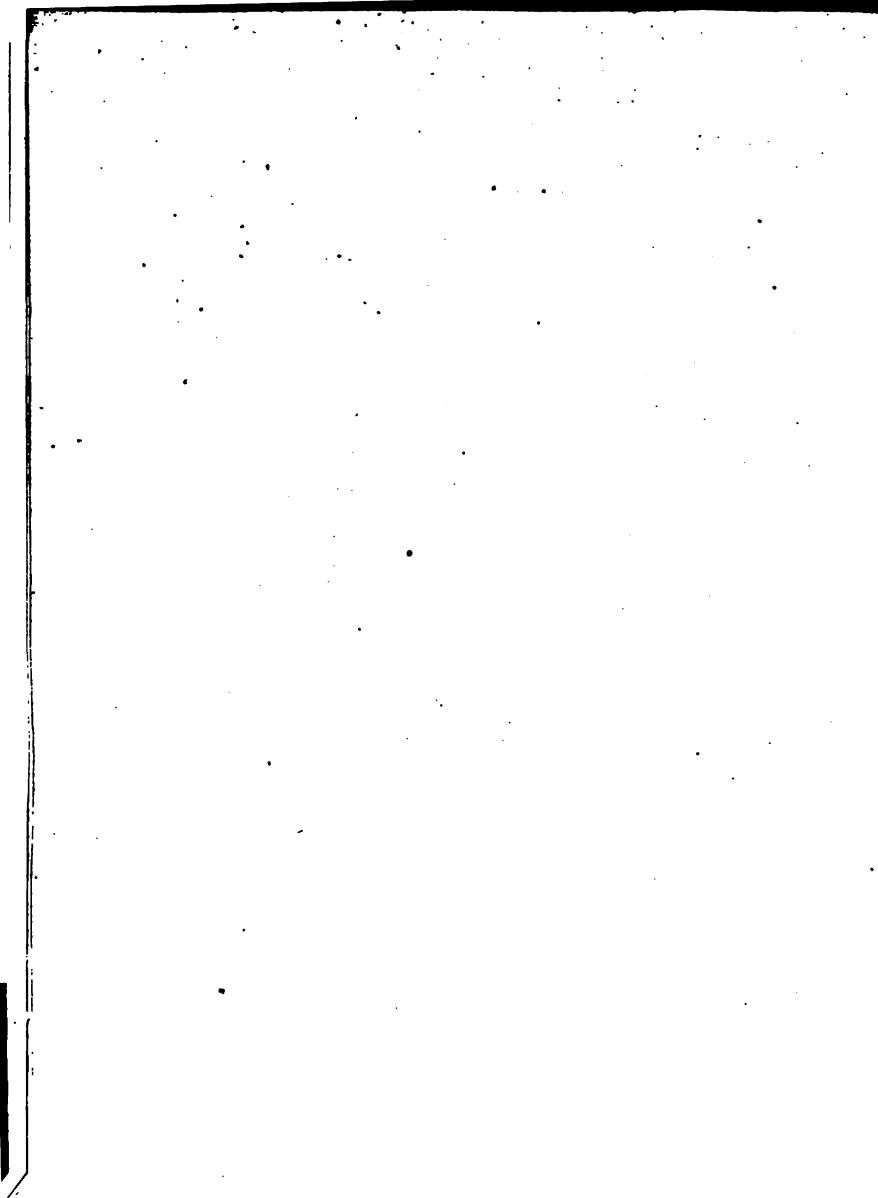
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